

July 1959

Pages 341 - 412

The Journal *of the* Society of Dyers and Colourists

Volume 75



Number 7

CONTENTS

THE SOCIETY OF DYERS AND COLOURISTS	341
AFFILIATED SOCIETIES	348
PROCEEDINGS OF THE SOCIETY	
ANNUAL GENERAL MEETING	349
ANNUAL DINNER	359
DYEING UNIONS CONTAINING ACRYLIC FIBRES (B. Kramrisch)	364
THE DYEING OF POLYESTER FIBRES AND BLENDS (H. W. Partridge)	373
THE FINISHING OF FABRICS CONTAINING WOOL BLENDED WITH TERYLENE OR ACRYLIC FIBRES (C. S. Whewell)	378
THE USES OF ACRYLIC FIBRE BLENDS WITH REFERENCE TO COLOUR FASTNESS (H. D. Edwards and N. Jackson)	383
CORRESPONDENCE	384
NOTES	387
OBITUARY NOTICE	392
NEW BOOKS AND PUBLICATIONS	392
ABSTRACTS	394
SUPPLEMENT	
COLOUR INDEX ADDITIONS AND AMENDMENTS	S1

THE SOCIETY OF DYERS AND COLOURISTS
DEAN HOUSE PICCADILLY BRADFORD YORKSHIRE

PUBLICATIONS AVAILABLE FROM
THE SOCIETY OF DYERS AND COLOURISTS
DEAN HOUSE 19 PICCADILLY BRADFORD 1 YORKSHIRE

JOURNAL OF THE SOCIETY OF DYERS AND COLOURISTS
(published monthly) Price to Non-members per annum £5 5s

SECOND EDITION OF THE COLOUR INDEX
Price £40 per set of four volumes

THE THEORY AND PRACTICE OF WOOL DYEING (Second Edition)
By C L BIRD Price 15s

IDENTIFICATION OF DYES ON TEXTILE FIBRES AND DETECTION OF
METALS IN FIBROUS MATERIALS, DYES, AND ORGANIC PIGMENTS
(Second Edition)
By ELLIS CLAYTON Price 10s 6d

REPORTS OF THE COMMITTEES ON THE DYEING
PROPERTIES OF DIRECT COTTON, VAT, AND WOOL DYES
Price 5s

RECENT ADVANCES IN THE COLOURING OF MAN-MADE FIBRES
Proceedings of a Symposium held at Buxton in September 1957
Price £2

BLEACHING, DYEING, AND FINISHING TO-DAY
Proceedings of a Symposium held at Portrush, Northern Ireland in September 1955
Price £1 10s

TEXTILE PRINTING
Proceedings of a Symposium held at St. Annes-on-Sea in September 1953
Price £1 10s

STANDARD METHODS FOR THE ASSESSMENT OF
THE COLOUR FASTNESS OF TEXTILES
(Third Report of the Fastness Tests Co-ordinating Committee)
Price 7s 6d
(First Supplement Price 3s 6d)

LABORATORY COURSE IN DYEING
By C H GILES Price 17s 6d (plus 8d postage)

THE DYEING AND FINISHING OF HALF HOSE AND OTHER FOOTWEAR
By ARVED DATYNER Price 7s 6d

REVIEW OF TEXTILE PROGRESS
Volume I 1949 £1 Volume II 1950 £1 5s
Volume III 1951 Volume IV 1952 Volume V 1953
£1 15s each (£1 8s to S.D.C. & T.I. Members)
Volume VI 1954 £1 17s 6d (£1 10s to S.D.C. & T.I. Members)
Volume VII 1955 Volume VIII 1956 Volume IX 1957
£2 2s each (£1 13s to S.D.C. & T.I. Members)
(postage extra on each volume)

ASDC EXAMINATION
QUESTION PAPERS AND REPORT OF THE DIPLOMAS
EXECUTIVE SUB-COMMITTEE
1954 1955 1956 1957 1958 Price 1s each

COLOUR INDEX

Additions and Amendments*

Number 4

July 1959

In order that inclusion of the lists of Additions and Amendments shall not interfere with the normal production of the *Journal*, they will, as from July 1959, appear as a Supplement to the *Journal* and will be separately paginated (from S1). This will enable them to be bound with the *Journal* if desired, as they will be included in the Annual Index.

Subscribers can obtain these lists printed on one side of the paper only. For further details apply to the General Secretary, The Society of Dyers and Colourists, Dean House, 19 Piccadilly, Bradford 1, Yorkshire, England.

VOLUME 1

Additional Colour Index Designations and Numbers

Page

1052

C.I. 18690

Monoazo (metallised)

C.I. Acid Yellow 121

HUE Reddish Yellow

Neutrichrome Yellow JRL Fran

1090

C.I. 12714

Monoazo (metallised)

C.I. Acid Orange 92

HUE Reddish Orange

Neutrichrome Orange RL Fran

1189

Monoazo

C.I. Acid Red 239

HUE Bright Red

Coomassie Geranine 2G ICI

Monoazo

C.I. Acid Red 240

HUE Bright Yellowish Red

Lissamine Fast Scarlet R ICI

Disazo

C.I. Acid Red 241

HUE Bright Bluish Red

Naphthalene Leather Red A ICI

Monoazo

C.I. Acid Red 242

HUE Bright Red

Supracid Brilliant Red B Fran

Literature

FP 834833

Monoazo (metallised)

C.I. Acid Red 243

HUE Bright Red

Neutrichrome Red JL Fran

* Supplement to the July 1959 issue of the *Journal* of the Society of Dyers and Colourists (published September 1959).

Page

1227

Monoazo (metallised)**C.I. Acid Violet 81**

HUE **Bright Bluish Violet**
Neutrichrome Violet BL Fran
Literature
FP 1129702, 1161640

1305

Anthraquinone**C.I. Acid Blue 175**

HUE **Bright Greenish Blue**
Carbolan Brilliant Blue 2G ICI

1374

Disazo**C.I. Acid Brown 215**

HUE **Dull Brown**
Naphthalene Leather Brown L ICI

C.I. 34906**Trisazo** (metallised)**C.I. Acid Brown 216**

HUE **Dull Reddish Brown**
Inoderme Dark Brown BJ Fran

1404

Monoazo (metallised)**C.I. Acid Black 98**

HUE **Greenish Grey**
Neutrichrome Grey 6BL Fran
Literature
FP 1129702, 1161640

1431

Monoazo**C.I. Mordant Yellow 61**

HUE **Dull Reddish Yellow**
Solochromate Fast Yellow R... ICI

1480

Monoazo**C.I. Mordant Red 85**

HUE **Dull Bluish Red**
Solochromate Fast Bordeaux BN ICI

1584

Monoazo**C.I. Mordant Brown 91**

HUE **Dull Yellowish Brown**
Solochromate Fast Brown G... ICI

1615

Monoazo**C.I. Mordant Black 78**

HUE **Black**
Chrome Fast Black PBL Fran
Literature
FP 1173832
Belgian P 566096

Page
1615

Monoazo

C.I. Mordant Black 79

HUE Bluish Grey
Chrome Fast Grey BRL ... Fran
Literature
FP 1173833
Belgian P 566852

1675

Nitro

C.I. Disperse Yellow 42

HUE Polyester Bright Yellow
Esterquinone Light Yellow 3JLL ... Fran

Monoazo

C.I. Disperse Yellow 43

HUE Polyester Bright Greenish Yellow
Esterophile Light Yellow 6JL ... Fran
Literature
FP 1164365, 1187253

Monoazo

C.I. Disperse Yellow 44

HUE Polyester Bright Reddish Yellow
Esterophile Light Yellow 2RL ... Fran
Literature
FP 1176871, 1187253

1686

Disazo

C.I. Disperse Orange 22

HUE Polyester Bright Yellowish Orange
Esterophile Light Yellow 3RLL ... Fran
Literature
FP 1187253

1703

Disazo

C.I. Disperse Red 44

HUE Polyester Bluish Red
Esterophile Light Red BL ... Fran
Literature
FP 1187252, 1187253

Monoazo

C.I. Disperse Red 45

HUE Polyester Bright Red
Esterophile Light Scarlet 3RL ... Fran
Literature
FP 1187252, 1187253

Monoazo

C.I. Disperse Red 46

HUE Polyester Yellowish Pink
Esterophile Light Orange 2RLL ... Fran
Literature
FP 1164365, 1187253

Page
1711

Disazo**C.I. Disperse Violet 16**

HUE Polyester **Bright Reddish Violet**
Esterophile Light Red 6BLL ... Fran
Literature
 FP 1187253

Anthraquinone**C.I. Disperse Violet 17**

HUE Polyester **Bright Reddish Violet**
Esterokinone Light Red 4BLL ... Fran

1729

Anthraquinone**C.I. Disperse Blue 39**

HUE Polyvinyl **Bright Blue**
Acetoquinone Pure Blue RH ... Fran
Literature
 BP 765356
 USP 2795477
 FP 1085424
 GP 1012284
 Ital P 518048

Anthraquinone**C.I. Disperse Blue 40**

HUE Polyester **Bright Greenish Blue**
Esterophile Light Blue BJLL ... Fran

Amendments

Page	Colour Index Designation		
1003	C.I. Acid Yellow 1	delete	Fouramine S ... Fran
		delete	Naphthol Yellow SS ... Fran
1005	C.I. Acid Yellow 5	add	Brilliant Acid Flavine 5J ... Fran
1006	C.I. Acid Yellow 7	add	Brilliant Acid Flavine 10J ... Fran
		delete	C.I. Acid Yellow 8
1007	C.I. Acid Yellow 9	delete	Acid Yellow 2S ... Fran
1008	C.I. Acid Yellow 11	delete	Fast Light Yellow 2G ... W
		delete	Lutetia Yellow ... Fran
		delete	Pyrazolone Yellow JF ... Fran
1009	C.I. Acid Yellow 13	add	Acid Light Yellow 3J ... Fran
1010	C.I. Acid Yellow 17	for	Xylene Light Yellow 3GS ... S
		read	Xylene Yellow 3GS ... S
		add	Fast Light Yellow 2G ... W
1012	C.I. Acid Yellow 21	delete	Acid Light Yellow JR ... Fran
1013	C.I. Acid Yellow 23	add	Ammonium salt
			Ink Yellow ASN ... Fran
1014	C.I. Acid Yellow 25	delete	Amacid Yellow R ... AAP
1023		delete	C.I. Acid Yellow 45
1027	C.I. Acid Yellow 54	add	Inochrome Yellow JLN ... Fran
		add	Super Fast Yellow ELNA ... TAC
1029		delete	C.I. Acid Yellow 58
1032	C.I. Acid Yellow 65	delete	Neutral Silk Yellow J ... Fran
	C.I. Acid Yellow 66	delete	Acetate Fast Yellow 2J ... Fran
1035	C.I. Acid Yellow 73	delete	Acid Fluoresceine N ... Fran
1041		delete	C.I. Acid Yellow 91
1042		delete	C.I. Acid Yellow 94
1043	C.I. Acid Yellow 98	delete	Inochrome Yellow J ... Fran

Page	Colour Index Designation				
1044	C.I. Acid Yellow 99	add	Inoderme Yellow JR ...	...	Fran
	C.I. Acid Yellow 100	delete	Inochrome Yellow R ...	...	Fran
1048	C.I. Acid Yellow 111	for read	Dermafast Yellow 3GL ...	...	S
			Derma Light Yellow 3GL ...	...	S
1049	C.I. Acid Yellow 112	for read	Dermafast Yellow GLN ...	...	S
			Derma Light Yellow GLN ...	...	S
1050	C.I. Acid Yellow 114	for read	Dermafast Yellow GL ...	...	S
			Derma Light Yellow GL ...	...	S
1056	C.I. Acid Orange 7	add	Orange II SM ...	...	Fran
1058	C.I. Acid Orange 10	add	Ammonium salt Ink Orange JSN ...	...	Fran
	C.I. Acid Orange 11	delete	Eosine 2J ...	...	Fran
1059	C.I. Acid Orange 12	delete	Croceine Orange R ...	...	Fran
1060	C.I. Acid Orange 14	delete	Acid Ponceau 2J ...	...	Fran
1061	C.I. Acid Orange 16	delete	Acid Orange RN ...	...	Fran
1062	C.I. Acid Orange 19	delete	Supracid Red 2J ...	...	Fran
1064	C.I. Acid Orange 24	delete	Resorcinol Brown B ...	...	Fran
1069		delete	C.I. Acid Orange 37	...	
1073	C.I. Acid Orange 45	delete	Neutral Silk Orange R...	...	Fran
1076	C.I. Acid Orange 51	add	Amacid Neutral Brown RN ...	...	AAP
1078		delete	C.I. Acid Orange 58	...	
1083		delete	C.I. Acid Orange 73	...	
1084	C.I. Acid Orange 74	add	Inoderme Orange J ...	...	Fran
1086	C.I. Acid Orange 80	for read	Dermafast Yellow 2RL ...	...	S
			Derma Light Yellow 2RL ...	...	S
1087	C.I. Acid Orange 82	for read	Dermafast Orange RLN ...	...	S
			Derma Light Orange RLN ...	...	S
		delete	Acid Orange 83	...	
1091	C.I. Acid Red 1	add add	Acid Phloxine GA ...	...	TAC
			Ammonium salt Ink Red JSN ...	...	Fran
1101	C.I. Acid Red 23	delete	Acetophenylene Red B...	...	Fran
1104	C.I. Acid Red 29	delete	Chromotrope 2R ...	...	Fran
1108	C.I. Acid Red 37	for read	Fast Light Red BG ...	...	YDC
			Fast Light Red GL ...	...	YDC
1112	C.I. Acid Red 47	delete	Brilliant Croceine 9B ...	...	Fran
1122		delete	C.I. Acid Red 72	...	
1123	C.I. Acid Red 73	add	Brilliant Croceine P ...	...	Fran
1125		delete	C.I. Acid Red 79	...	
1127		delete	C.I. Acid Red 84	...	
1128	C.I. Acid Red 86	delete	Brilliant Milling Red 2B ...	...	Fran
1129	C.I. Acid Red 87	delete	Eosine J ...	...	Fran
		delete	Eosine L, LS ...	...	Fran
1132	C.I. Acid Red 92	delete	Eosine Blue Shade 2B ...	...	Fran
	C.I. Acid Red 93	delete	Rose Bengal YB ...	...	W
1133	C.I. Acid Red 94	delete	Rose Bengale ...	...	Fran
1134	C.I. Acid Red 97	delete	Acid Leather Scarlet J ...	...	Fran
		add	Coriacid Scarlet R ...	...	Fran
	C.I. Acid Red 98	delete	Phloxine 2BI, J ...	...	Fran
1138		delete	C.I. Acid Red 105	...	
1141	C.I. Acid Red 114	add	Milling Red B ...	...	Fran
1142	C.I. Acid Red 115	for read	Acid Fast Bordeaux B ...	...	Fran
			Acid Fast Bordeaux BN ...	...	Fran
	C.I. Acid Red 116	add	Acetacid Brilliant Red BR ...	...	Fran
1146		delete	C.I. Acid Red 124	...	
1156	C.I. Acid Red 145 in the heading	add add	C.I. 23905 Disazo Light Milling Scarlet 3R ...	...	Fran
1158	C.I. Acid Red 152	delete	Milling Red N ...	...	Fran
1169	C.I. Acid Red 183	add	Super Fast Red GRE ...	...	TAC
1170	C.I. Acid Red 184	for read	Inochrome Brown 2R ...	...	Fran
			Inochrome Brown B2R ...	...	Fran
1171	C.I. Acid Red 186	delete	Inochrome Pink N ...	...	Fran
		add	Super Fast Pink BNA ...	...	TAC

Page	Colour Index Designation			
1173	C.I. Acid Red 192	delete	Inochrome Pink JN	Fran
1176	C.I. Acid Red 201	add	Inochrome Pink N	Fran
1177		delete	C.I. Acid Red 204	
		delete	C.I. Acid Red 205	
1178		delete	C.I. Acid Red 208	
1179		delete	C.I. Acid Red 210	
1181	C.I. Acid Red 214	add	Inoderme Red J	Fran
1182	C.I. Acid Red 215	for	Dermafast Red BL	S
		read	Derma Light Red BL	S
	C.I. Acid Red 216	for	Dermafast Red 2GL	S
		read	Derma Light Red 2GL	S
	C.I. Acid Red 217	for	Dermafast Bordeaux RL	S
		read	Derma Light Bordeaux RL	S
1188	C.I. Acid Red 229			
	in the heading	add	Monoazo	
		for	HUE Red	
		read	HUE	
			Leather Red	
			Paper Bright Yellowish Red	
		add	Paper Acid Scarlet RJ	Fran
		delete	C.I. Acid Red 230	
1191	C.I. Acid Violet 1	delete	Acid Fast Violet RL	Fran
1194	C.I. Acid Violet 7	add	Acid Fuchsine 6B	TAC
1195	C.I. Acid Violet 9	delete	Brilliant Milling Violet B	Fran
		delete	Brilliant Milling Violet 2RLN	Fran
		add	Amacid Fast Red Violet 2R	AAP
1196	C.I. Acid Violet 12	add	Amido Naphthol Red 2B	TAC
1198	C.I. Acid Violet 15	for	Acid Brilliant Violet 6BN	YDC
		read	Acid Violet 6BN	YDC
1199	C.I. Acid Violet 17	delete	Brilliant Milling Violet 3B	Fran
1204	C.I. Acid Violet 27	delete	Fast Acid Violet BR	Fran
1211		delete	C.I. Acid Violet 44	
1214	C.I. Acid Violet 49	delete	Milling Violet 5B	Fran
1224	C.I. Acid Violet 72	delete	Milling Violet S2B	Fran
1230	C.I. Acid Blue 4	delete	Acid Navy Blue S	Fran
1232	C.I. Acid Blue 7	delete	Brilliant Milling Blue AS	Fran
		delete	Vulcafixe Blue 3B	Fran
1236	C.I. Acid Blue 15	delete	Brilliant Milling Blue BN	Fran
1237	C.I. Acid Blue 18	delete	Wool Fast Cyanine B	Fran
1238	C.I. Acid Blue 20	delete	Induline J	Fran
1239	C.I. Acid Blue 22	add	Soluble Blue C4B	Fran
		add	Ammonium salt	
			Ink Blue 7BSN	Fran
1240	C.I. Acid Blue 25	delete	Acid Alizarine Saphirol J	Fran
		delete	Acid Alizarine Sapphire J	Fran
			(see A & A, p. 4558)	
1249	C.I. Acid Blue 45	add	Acid Alizarine Sapphire B	Fran
1250	C.I. Acid Blue 48	delete	Soluble Blue 8B, C4B, C6B	Fran
1256	C.I. Acid Blue 59	add	Savinyl Blue B	S
1257	C.I. Acid Blue 62	add	Brilliant Alizarine Cyanine R	Fran
1267	C.I. Acid Blue 83	add	Coriacid Blue 2R	Fran
		delete	C.I. Acid Blue 84	
1268	C.I. Acid Blue 85	delete	Neutral Blue N	Fran
1269	C.I. Acid Blue 89	delete	Wool Fast Blue B	Fran
1274		delete	C.I. Acid Blue 101	
1278	C.I. Acid Blue 109	delete	Brilliant Acid Blue JR	Fran
	C.I. Acid Blue 110	delete	Alkali Blue 4B, 6B, R	Fran
1294		delete	C.I. Acid Blue 149	
1297	C.I. Acid Blue 155	delete	Inochrome Blue J	Fran
1299	C.I. Acid Blue 158	add	Super Fast Blue GGNS	TAC
1299	C.I. Acid Blue 158A	add	Inoderme Blue 2J	Fran
1300	C.I. Acid Blue 161	delete	Inochrome Blue B	Fran
1301	C.I. Acid Blue 163	delete	Inochrome Blue JR	Fran
1307	C.I. Acid Green 1	add	Amacid Green N	AAP
1310	C.I. Acid Green 7	delete	Brilliant Acid Green A	Fran

Page	Colour Index Designation				
1312	C.I. Acid Green 12	add	Inoderme Green B	... ..	Fran
		add	Supracid Green BL	... ..	Fran
1314	C.I. Acid Green 16	add	Ammonium salt		
			Ink Green JSN	... ..	Fran
1316	C.I. Acid Green 20	delete	Wool Green Black J	... ..	Fran
1320		delete	C.I. Acid Green 29		
		delete	C.I. Acid Green 30		
		delete	C.I. Acid Green 31		
1321		delete	C.I. Acid Green 32		
	C.I. Acid Green 33	delete	Setolane Neutral Green J	... ..	Fran
1324	C.I. Acid Green 40	for	Dermafast Green BL	... ..	S
		read	Derma Light Green BL	... ..	S
1328	C.I. Acid Green 50	delete	Acid Green SS	... ..	Fran
1329	C.I. Acid Brown 2	add	Supracid Brown R	... ..	Fran
1340	C.I. Acid Brown 28	for	Dermafast Brown RL	... ..	S
		read	Derma Light Brown RL	... ..	S
1341	C.I. Acid Brown 30	for	Dermafast Brown 3RL	... ..	S
		read	Derma Light Brown 3RL	... ..	S
1343		delete	C.I. Acid Brown 35		
1358		delete	C.I. Acid Brown 111		
1364	C.I. Acid Brown 143	add	Inoderme Dark Brown 2R	... ..	Fran
1376	C.I. Acid Black 2	delete	Nigrosine B powder	... ..	Fran
		delete	Nigrosine CNNS	... ..	Fran
1377	C.I. Acid Black 4	delete	Felt Black B	... ..	Fran
	C.I. Acid Black 5	delete	Acid Black L	... ..	Fran
		delete	C.I. Acid Black 6		
1379		delete	C.I. Acid Black 11		
1381	C.I. Acid Black 16	delete	Acid Black 2JL	... ..	Fran
	C.I. Acid Black 17	delete	Naphthalene Black 12R	... ..	Fran
1383		delete	C.I. Acid Black 22		
1385	C.I. Acid Black 26	add	Diphenylamine Black AB	... ..	Fran
1386	C.I. Acid Black 28	delete	Naphthalene Black 12BR	... ..	Fran
1387	C.I. Acid Black 31	add	Supracid Black R	... ..	Fran
1389		delete	C.I. Acid Black 37		
1390	C.I. Acid Black 41	add	Naphthalene Reserve Black 12B	... ..	Fran
1395	C.I. Acid Black 52	for	Inochrome Black B	... ..	Fran
		read	Inochrome Black BNI extra	... ..	Fran
		add	Inoderme Grey B	... ..	Fran
1396	C.I. Acid Black 54	delete	Inochrome Grey 2J	... ..	Fran
			(see A & A p. 4559)		
1397		delete	C.I. Acid Black 57		
1399	C.I. Acid Black 63	add	Neutrichrome Black RL	... ..	Fran
1407	C.I. Mordant Yellow 1	delete	Chrome Yellow R2J	... ..	Fran
		delete	Tertrochrome Yellow 2G	... ..	CT
1409	C.I. Mordant Yellow 5	add	Chrome Fast Flavine J	... ..	Fran
1411	C.I. Mordant Yellow 10	delete	Mordant Yellow 2J	... ..	Fran
		add	Tertrochrome Yellow R	... ..	CT
1416	C.I. Mordant Yellow 21	delete	Chrome Fast Yellow R extra	... ..	Fran
1419	C.I. Mordant Yellow 26	add	Chromine Yellow R	... ..	Fran
1421	C.I. Mordant Yellow 30	add	Chrome Fast Yellow J2RL	... ..	Fran
1423	C.I. Mordant Yellow 34	delete	Tertrochrome Yellow R	... ..	CT
1430		delete	C.I. Mordant Yellow 52		
		delete	C.I. Mordant Yellow 53		
1431		delete	C.I. Mordant Yellow 56		
1442		delete	C.I. Mordant Orange 20		
1444		delete	C.I. Mordant Orange 25		
1451	C.I. Mordant Red 2	delete	Alizarine A	... ..	Fran
1452	C.I. Mordant Red 4	delete	Alizarine F	... ..	Fran
		delete	Alizarine Purpurine N	... ..	Fran
1453	C.I. Mordant Red 5	for	Chrome Fast Bordeaux R	... ..	Fran
		read	Chrome Fast Bordeaux JR	... ..	Fran
1454	C.I. Mordant Red 8	delete	Milling Red JB	... ..	Fran
1456	C.I. Mordant Red 11	for	Alizarine Red 3B	... ..	Fran
		read	Alizarine 3B	... ..	Fran

Page	Colour Index Designation		
1475	C.I. Mordant Red 59	delete	Chrome Grenadine J Fran
1483	C.I. Mordant Violet 5	add	Chrome Violet R Fran
1488	C.I. Mordant Violet 16	add	Chrome Brilliant Violet ECR ... Fran
1495	C.I. Mordant Violet 34	delete	Chrome Brilliant Violet ECR ... Fran
		delete	Chromine Brilliant Violet ECR ... Fran
1498	C.I. Mordant Violet 44	delete	Chrome Fast Violet RL Fran
		delete	C.I. Mordant Violet 45
1500	C.I. Mordant Violet 50	delete	Ultra Violet MO... .. S
1503	C.I. Mordant Blue 1	add	Chrome Sky Blue B Fran
1505	C.I. Mordant Blue 6	delete	Chrome Blue F Fran
1514	C.I. Mordant Blue 27	delete	Alizarine Blue S... .. Fran
1515	C.I. Mordant Blue 29	add	Chromine Sky Blue S Fran
1527		delete	C.I. Mordant Blue 61
1528		delete	C.I. Mordant Blue 64
1536	C.I. Mordant Green 16	delete	Chromaven Green G AAP
1543	C.I. Mordant Green 32	delete	Chrome Green J Fran
1556	C.I. Mordant Brown 13	delete	Omega Chrome Brown W S
1557	C.I. Mordant Brown 15	add	Chrome Fast Brown REN Fran
1562		delete	C.I. Mordant Brown 28
1565	C.I. Mordant Brown 33	add	Chrome Fast Brown 2R Fran
		add	Dermachrome Brown 2R Fran
1569	C.I. Mordant Brown 42	add	Anthracene Brown N Fran
1576	C.I. Mordant Brown 60	delete	Chrome Reserve Brown 4R Fran
1579	C.I. Mordant Brown 69	delete	Dermachrome Brown CB Fran
1580		delete	C.I. Mordant Brown 72
1581		delete	C.I. Mordant Brown 77
1583		delete	C.I. Mordant Brown 84
1585	C.I. Mordant Black 1	for read	Chrome Fast Black A Fran
			Chrome Fast Black AS Fran
1586	C.I. Mordant Black 3	delete	Chrome Blue Black B Fran
1587	C.I. Mordant Black 5	delete	Chrome Fast Black F Fran
1593	C.I. Mordant Black 17	add	Chrome Blue Black RF Fran
1602	C.I. Mordant Black 38	add	Chrome Fast Grey JL Fran
1606	C.I. Mordant Black 49	delete	Chrome Black R Fran
1609	C.I. Mordant Black 56	delete	Chrome Black J Fran
1611		delete	C.I. Mordant Black 63
1620	C.I. Basic Yellow 3	delete	Auramine J Fran
1624	C.I. Basic Orange 7	delete	Sabaphosphine M S
1625	C.I. Basic Orange 10	delete	Brilliant Phosphine 2J Fran
1626	C.I. Basic Orange 14	delete	Acridine Brilliant Orange E ... Fran
	C.I. Basic Orange 15	delete	Phosphine B Fran
1628	C.I. Basic Orange 23	delete	Phosphine AL Fran
1631	C.I. Basic Red 8	delete	Rhodamine J Fran
	C.I. Basic Red 11	delete	Rhodamine S Fran
1633	C.I. Basic Violet 1	delete	Paris Violet Extra Conc. A ... Fran
	C.I. Basic Violet 2	delete	New Fuchsin O Fran
1637	C.I. Basic Violet 12	delete	Methylene Heliotrope N Fran
1639	C.I. Basic Blue 1	for read	Methylene Turquoise J Fran
			Methylene Turquoise JSA Extra ... Fran
1640	C.I. Basic Blue 5	delete	Methylene Cyanine N Fran
1644	C.I. Basic Blue 17	delete	Toluidine Blue N Fran
1645	C.I. Basic Blue 24	delete	New Methylene Blue S Fran
1646	C.I. Basic Blue 25	delete	Thionine Blue J Fran
	C.I. Basic Blue 26	add	Victoria Blue BS Fran
1648	C.I. Basic Green 4	delete	Malachite Green Extra Conc. A ... Fran
		delete	Malachite Green J3EM (Hydrochloride) Fran
	C.I. Basic Green 5	delete	Methylene Green JZ Fran
1653	C.I. Basic Black 1	delete	Methylene Grey B Fran
		delete	Methylene Grey J Fran
1659	C.I. Disperse Yellow 1	for read	Amacel Golden Yellow VIII ... AAP
			Amacel Yellow RR AAP

Page	Colour Index Designation				
1660	C.I. Disperse Yellow 3	under	HUE		
		add	Polyester Bright Yellow		
		for	Artisil Direct Yellow G	...	S
		read	Artisil Yellow G	...	S
		for	Artisil Direct Yellow 2GN	...	S
		read	Artisil Yellow 2GN	...	S
		add	Esteroquinone Light Yellow 4JL	...	Fran
1662	C.I. Disperse Yellow 8	for	Artisil Direct Yellow GN	...	S
		read	Artisil Yellow GN	...	S
		add	Acetoquinone Light Yellow 2JLZ	...	Fran
1664	C.I. Disperse Yellow 12	for	Artisil Direct Yellow 5GN	...	S
		read	Artisil Yellow 5GN	...	S
1667	C.I. Disperse Yellow 19	for	Artisil Direct Yellow 5GP	...	S
		read	Artisil Yellow 5GP	...	S
1668	C.I. Disperse Yellow 23 in the heading	add	C.I. 26070		
		under	HUE		
		add	Polyester Yellowish Orange		
		add	Acetoquinone Light Yellow 3RLLZ	...	Fran
		add	Artisil Yellow RGFL	...	S
		add	Esteroquinone Light Yellow 3RLL	...	Fran
		add	Foron Yellow RGFL ultra-dispersed	...	S
		add	Nyloquinone Yellow 3R	...	Fran
1670	C.I. Disperse Yellow 28	for	Amacel Golden Yellow IX	...	AAP
		read	Amacel Yellow GNR	...	AAP
		delete	C.I. Disperse Yellow 29		
		delete	C.I. Disperse Yellow 30		
1673		delete	C.I. Disperse Yellow 36 and transfer the information to C.I. Disperse Yellow 23		
1674	C.I. Disperse Yellow 37	add	Amacron Yellow LS	...	AAP
1677	C.I. Disperse Orange 2	add	Amacel Golden Yellow FSI	...	AAP
1678	C.I. Disperse Orange 3	for	Artisil Direct Orange 2R	...	S
		read	Artisil Orange 2R	...	S
		for	Artisil Direct Orange 2RP	...	S
		read	Artisil Orange 2RP	...	S
	C.I. Disperse Orange 4	for	Acetazol Orange R	...	Fran
		read	Acetazol Orange RZ	...	Fran
1679	C.I. Disperse Orange 5	for	Artisil Direct Brown H	...	S
		read	Artisil Brown H	...	S
		add	Amacron Orange LS	...	AAP
1680	C.I. Disperse Orange 8	for	Artisil Direct Orange 4RP	...	S
		read	Artisil Orange 4RP	...	S
1682	C.I. Disperse Orange 11	for	Artisil Direct Orange 3RP	...	S
		read	Artisil Orange 3RP	...	S
		add	Acetoquinone Light Orange JL	...	Fran
		add	Nyloquinone Orange JR	...	Fran
1684	C.I. Disperse Orange 15	for	Amacel Golden Orange III	...	AAP
		read	Amacel Golden Orange 3G	...	AAP
1685	C.I. Disperse Orange 17	add	Amacron Orange GLS	...	AAP
	C.I. Disperse Orange 18	add	Esteroquinone Light Brown JR	...	Fran
1686	C.I. Disperse Orange 20	for	Artisil Direct Orange GFL	...	S
		read	Artisil Orange GFL	...	S
		add	Foron Orange GFL ultra-dispersed	...	S
	C.I. Disperse Orange 21	for	Artisil Direct Orange RFL	...	S
		read	Artisil Orange RFL	...	S
		add	Foron Orange RFL ultra-dispersed	...	S
1687	C.I. Disperse Red 1	add	Acetoquinone Light Scarlet BLZ	...	Fran
		add	Nyloquinone Red N	...	Fran
	C.I. Disperse Red 2	for	Artisil Direct Scarlet GP	...	S
		read	Artisil Scarlet GP	...	S
1688	C.I. Disperse Red 4	under	HUE		
		add	Polyester Bluish Pink		
		add	Acetoquinone Light Pink RLZ	...	Fran
		add	Esteroquinone Light Pink RLL	...	Fran
		add	Nyloquinone Pink B	...	Fran
1689	C.I. Disperse Red 5	for	Amacel Rubine IX	...	AAP
		read	Amacel Rubine 3B	...	AAP
		for	Artisil Direct Rubine R	...	S
		read	Artisil Rubine R	...	S

Page	Colour Index Designation			
1690	C.I. Disperse Red 7	under	HUE	
		add	Polyester Bright Reddish Orange	
		add	Acetoquinone Light Scarlet JRZ ...	Fran
		add	Esterquinone Scarlet JR ...	Fran
		add	Nyloquinone Red J ...	Fran
		for	Amacel Scarlet III ...	AAP
		read	Amacel Scarlet 3G ...	AAP
1691	C.I. Disperse Red 9	for	Amacel Red VI-X ...	AAP
		read	Amacel Fast Pink G ...	AAP
1693	C.I. Disperse Red 13	add	Acetoquinone Light Rubine BLZ ...	Fran
		add	Nyloquinone Bordeaux B ...	Fran
1694	C.I. Disperse Red 15	for	Acetoquinone Light Rose RL ...	Fran
		read	Acetoquinone Light Gooseberry RL ...	Fran
		for	Amacel Red VII ...	AAP
		read	Amacel Pink B ...	AAP
		for	Artisil Direct Red 3BP ...	S
		read	Artisil Red 3BP ...	S
1695	C.I. Disperse Red 17	for	Amacel Red VIII ...	AAP
		read	Amacel Red GG ...	AAP
		add	Acetoquinone Light Red BZ ...	Fran
		add	Nyloquinone Red BN ...	Fran
1698	C.I. Disperse Red 24	for	Artisil Direct Red BP ...	S
		read	Artisil Red BP ...	S
		for	Artisil Direct Red BPS ...	S
		read	Artisil Red BPS ...	S
1700	C.I. Disperse Red 30	under "The following brand is similar"	for	Artisil Direct Red B ... S
			read	Artisil Red B ... S
	C.I. Disperse Red 31	delete	Nyloquinone Red B ...	Fran
1702		delete	C.I. Disperse Red 37	
1703		delete	C.I. Disperse Red 42	
1705	C.I. Disperse Violet 1	for	Amacel Heliotrope I ...	AAP
		read	Amacel Heliotrope R ...	AAP
		for	Artisil Direct Violet 2RP ...	S
		read	Artisil Violet 2RP ...	S
		add	Nyloquinone Violet R ...	Fran
1706	C.I. Disperse Violet 4	for	Amacel Violet II ...	AAP
		read	Amacel Violet 6B ...	AAP
	under "The following brands are similar"	for	Artisil Direct Violet BP ...	S
		read	Artisil Violet BP ...	S
1713	C.I. Disperse Blue 1	for	Artisil Direct Blue SAP ...	S
		read	Artisil Blue SAP ...	S
	under "The following brands are similar"	delete	Acetoquinone Blue 2R ...	Fran
1714	C.I. Disperse Blue 3	for	Artisil Direct Blue BSQ ...	S
		read	Artisil Blue BSQ ...	S
		add	Acetoquinone Light Pure Blue R ...	Fran
1716	C.I. Disperse Blue 7	under	HUE	
		add	Polyester Bright Greenish Blue	
		for	Artisil Direct Blue Green GP ...	S
		read	Artisil Blue Green GP ...	S
		add	Esterquinone Light Blue 4JL ...	Fran
		delete	Amacel Green Blue II ...	AAP
		add	Amacel Green Blue B, G ...	AAP
1719	C.I. Disperse Blue 14	for	Artisil Direct Blue BRP ...	S
		read	Artisil Blue BRP ...	S
1720	C.I. Disperse Blue 16	for	Artisil Direct Blue 4GP ...	S
		read	Artisil Blue 4GP ...	S
	C.I. Disperse Blue 17	for	Artisil Direct Blue 5G ...	S
		read	Artisil Blue 5G ...	S
1721	C.I. Disperse Blue 18	for	Artisil Direct Blue BP ...	S
		read	Artisil Blue BP ...	S
	C.I. Disperse Blue 19	for	Artisil Direct Blue 2RP ...	S
		read	Artisil Blue 2RP ...	S
1722	C.I. Disperse Blue 20	for	Artisil Direct Blue GFL ...	S
		read	Artisil Blue GFL ...	S
		add	Foron Blue GFL ultra-dispersed ...	S

Page	Colour Index Designation				
1726	C.I. Disperse Blue 29	for	Artisil Direct Navy BNP	...	S
		read	Artisil Navy BNP	...	S
1730	under Disperse Navy Mixtures	for	Artisil Direct Navy BNS	...	S
		read	Artisil Navy BNS	...	S
		for	Artisil Direct Navy BR	...	S
		read	Artisil Navy BR	...	S
1732	under Disperse Green Mixtures	for	Artisil Direct Green BLP	...	S
		read	Artisil Green BLP	...	S
1733	under Disperse Brown Mixtures	delete	Acetoquinone Brown BT	...	Fran
		for	Artisil Direct Brown BP	...	S
		read	Artisil Brown HP	...	S
		for	Artisil Direct Brown BT	...	S
		read	Artisil Brown BT	...	S
		for	Artisil Direct Brown ENZ	...	S
		read	Artisil Brown ENZ	...	S
		for	Artisil Direct Brown GP	...	S
		read	Artisil Brown GP	...	S
		for	Artisil Direct Brown RLN	...	S
		read	Artisil Brown RLN	...	S
1735	C.I. Disperse Black 1	under	HUE		
		add	Polyester Bluish Black		
		add	Esterquinone Diazo Black N	...	Fran
	C.I. Disperse Black 2	add	Acetoquinone Diazo Navy 2BZ	...	Fran
		add	Nyloquinone Diazo Navy 2B	...	Fran
1737	C.I. Disperse Black 7	for	Amacel Black IV	...	AAP
		read	Amacel Black 4S	...	AAP
1738	C.I. Disperse Black 9	add	Amacel Black JRW	...	AAP
1739	C.I. Disperse Black 12	under	HUE		
		add	Polyester Black (after diazotisation)		
		add	Esterazol Light Black BL, BLHT	...	Fran
		add	Selected brands are suitable for high temperature dyeing		
	C.I. Disperse Black 13	for	Artisil Direct Black BTN	...	S
		read	Artisil Black BTN	...	S
1741	under Disperse Grey Mixtures	for	Artisil Direct Grey BLP	...	S
		read	Artisil Grey BLP	...	S
		for	Artisil Direct Grey BNP	...	S
		read	Artisil Grey BNP	...	S
		for	Artisil Direct Grey BNP New	...	S
		read	Artisil Grey BNP New	...	S
1742	under Disperse Black Mixtures	for	Artisil Direct Black BKZ	...	S
		read	Artisil Black BKZ	...	S
		for	Artisil Direct Black GSP	...	S
		read	Artisil Black GSP	...	S
		delete	Acetoquinone Black BI	...	Fran

VOLUME 2

Additional Colour Index Designations and Numbers

Page				
2142	Monoazo		C.I. Direct Red 193	
		HUE Bright Red		
		Chlorazol Diazo Red 4B	...	ICI
2236	Disazo		C.I. Direct Blue 188	
		HUE Bright Blue		
		Durazol Blue R	...	ICI
	Phthalocyanine		C.I. Direct Blue 189	
		HUE Bright Greenish Blue		
		Durazol Turquoise Blue GR	...	ICI

Page

2359

Stilbene**C.I. Direct Black 102**

HUE **Brownish Grey**
Durazol Olive G ICI

2441

Anthraquinone**C.I. Vat Yellow 33**

HUE **Bright Yellow**
Caledon Yellow 4GL ICI

Anthraquinone**C.I. Solubilised Vat Yellow 34**

HUE **Bright Yellowish Orange**
Soledon Yellow 3R ICI

2477

C.I. Vat Red 49

HUE **Bluish Red**
Sandothrene Copper Red F-NR ... S

2489

Anthraquinone**C.I. Vat Violet 20**

HUE **Dull Bordeaux**
Caledon Rubine B ICI

2517

Anthraquinone**C.I. Vat Blue 52**

HUE **Bright Reddish Blue**
Caledon Blue 3RC ICI

2530

Anthraquinone**C.I. Vat Green 26**

HUE **Olive**
Caledon Olive OMW ICI

2530

Anthraquinone**C.I. Vat Green 27**

HUE **Dull Brownish Olive**
Caledon Olive RMW ICI

2563

Anthraquinone**C.I. Vat Black 34**

Caledon Direct Black AC ICI

2567

Phthalocyanine**C.I. Ingrain Blue 3**

HUE **Bright Greenish Blue**
Alcian Blue 7GX ICI

Page

2567

Phthalocyanine**C.I. Ingrain Blue 4**

HUE	Bright Blue			
Alcian Blue 2GX	...	...	...	ICI

2612

C.I. 37245**C.I. Azoic Diazo Component 109**

Brentamine Fast Black B	...	...	ICI
Fast Black B Base	...	...	Acna
Fast Black B Salt	...	...	Acna

2655

C.I. Azoic Red 67

HUE	Bright Red			
Brentacet Red B	...	...	...	ICI

C.I. Azoic Red 68

HUE	Bright Yellowish Red			
Brentacet Scarlet G	...	...	...	ICI

2666

C.I. Azoic Blue 28

HUE	Bright Blue			
Brentacet Blue B	...	...	...	ICI

2678

C.I. Azoic Black 9

Brentacet Black B	ICI
-------------------	-----	-----	-----

2717

C.I. 11765

Monoazo

C.I. Pigment Yellow 49

HUE	Bright Yellow			
Monolite Fast Yellow CV	...	...	...	ICI

Monoazo (Calcium lake)

C.I. Pigment Yellow 50

HUE	Bright Reddish Yellow			
Polymon Yellow R	...	...	...	ICI

Disazo

C.I. Pigment Yellow 51

HUE	Bright Reddish Yellow			
Vulcafor Fast Yellow R	...	...	...	ICI

2762

Disazo

C.I. Pigment Red 110

HUE	Bright Yellowish Red			
Vulcafor Fast Red Y	...	...	...	ICI

Page

2762

Disazo

C.I. Pigment Red 111

HUE Bright Red

Vulcafor Fast Scarlet G ... ICI

2929

C.I. Developer 18

HUE Dull Reddish Brown

Brentosyn RB ... ICI

C.I. Developer 19

CONSTITUTION Phloroglucinol (1,3,5-benzenetriol)

Hydroxanil G, P, 2R ... Mahr

Literature

USP 2546861

Amendments

Page	Colour Index Designation		
2054	C.I. Direct Orange 46	add	Tertrodirect Fast Orange 7GL ... CT
2068		delete	C.I. Direct Orange 86
2105	C.I. Direct Red 83	add	Amanil Supra Rubine BBL ... AAP
2109	C.I. Direct Red 95	add	Solar Scarlet RL ... S
2124		delete	C.I. Direct Red 136
2179	C.I. Direct Blue 22	delete	Chloramine Sky Blue RF ... S
2211		delete	C.I. Direct Blue 117
2283	C.I. Direct Brown 51	delete	Tertrodirect Bronze G ... CT
	C.I. Direct Brown 52	add	Tertrodirect Bronze G ... CT
2295	C.I. Direct Brown 95	add	Amanil Supra Brown LBL ... AAP
2345		delete	C.I. Direct Black 60
2413	C.I. Sulphur Black 1	delete	Sulphur Black 911 extra conc. new, 911 super conc. ... HDP
		add	Sulphur Black HD Grains 125 ... HDP
		add	Sulphur Black Liquid LRS ... HDP
	C.I. Solubilised Sulphur Black 1	for read	Sulphur Black 755 Liquid ... HDP
			Sulphur Black Liquid LSC ... HDP
2427	C.I. Vat Yellow 1	delete	Amanthrene Yellow G ... AAP
2452	C.I. Vat Orange 15	add	Amanthrene Golden Orange 3G ... AAP
2460	C.I. Vat Red 10	add	Amanthrene Red FBB ... AAP
2495	C.I. Vat Blue 5	delete	Amindigo Blue 2BD ... AAP
2543	C.I. Vat Brown 31	add	Amanthrene Red Brown ... AAP
2546		in the heading beneath add under add	C.I. Vat Brown 38 C.I. Solubilised Vat Brown 38 C.I. Solubilised Vat Brown 38 Soledon Dark Brown 6R ... ICI
2588	C.I. Azoic Diazo Component 25	add	Diazo Fast Red SW ... RL
2609	C.I. Azoic Diazo Component 49	add	Fast Orange RD Salt ... AAP
2616	C.I. Azoic Coupling Component 10	add	Amanil Naphthol AS-E ... AAP
2617	C.I. Azoic Coupling Component 13	add	Amanil Naphthol AS-SG ... AAP
	C.I. Azoic Coupling Component 14	add	Amanil Naphthol AS-PH ... AAP
2620	C.I. Azoic Coupling Component 25	add	Amanil Naphthol AS-SR ... AAP
2622	C.I. Azoic Coupling Component 34	add	Amanil Naphthol AS-EL ... AAP
2623	C.I. Azoic Coupling Component 35	add	Amanil Naphthol AS-LG ... AAP
2670	C.I. Azoic Brown 7	add	Sandogen Brown F-BL ... S
2683	C.I. Oxidation Base 2B	delete	Fouramine BO ... Fran
2686	C.I. Oxidation Base 8	delete	Fouramine SL ... Fran
	C.I. Oxidation Base 8B	delete	Fouramine ALO ... Fran

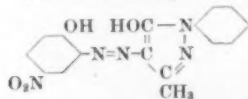
Page	Colour Index Designation		
2687	C.I. Oxidation Base 10	delete	Fouramine DR Fran
	C.I. Oxidation Base 10A	delete	Fouramine CD Fran
2688	C.I. Oxidation Base 12	delete	Fouramine DA Fran
	C.I. Oxidation Base 13A	delete	Fouramine SO Fran
2689	C.I. Oxidation Base 14	delete	Fouramine DP Fran
	C.I. Oxidation Base 15	delete	Fouramine ON Fran
2690	C.I. Oxidation Base 19	delete	Fouramine U Fran
2745	C.I. Pigment Red 57	delete	Segnale Rubine BKG Acna (see A & A, List No. 2)
		under	"Barium lake"
		add	Segnale Rubine BKC Acna
2753	C.I. Pigment Red 81	for	Phosphotungstomolybdic acid lake of C.I. Basic Red 3*
		read	Phosphotungstomolybdic acid lake of C.I. Basic Red 1*
2823	C.I. Solvent Yellow 19	add	Savinyl Yellow GRL S
2832	C.I. Solvent Yellow 48	add	Savinyl Yellow 3GS S
2834	C.I. Solvent Orange 5	add	Savinyl Orange GRL S
2845	C.I. Solvent Red 7	add	Savinyl Red 2BLS S
2900	C.I. Solvent Black 6	add	Savinyl Black BN S
2911	C.I. Fluorescent Brightening Agent 15	add	Photine C HDP

VOLUME 3

Additions and Amendments

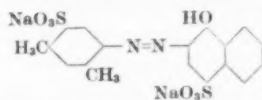
Page	Colour Index No.
3036	add

12714 C.I. Acid Orange 92 (new entry) (*Reddish Orange*)
A chromium complex of



2-Amino-4-nitrophenol \rightarrow 3-Methyl-1-phenyl-5-pyrazolone
then convert to the chromium complex

3057	for 14240 C.I. Acid Yellow T/301
	read 14240★ Acid Dye
	under 14251 C.I. Acid Brown 42
	for Treat C.I. 11920 with chromium formate
	read Treat C.I. 14250 with chromium formate
3061	14700 C.I. Food Red 1
	the constitution for this item should read—

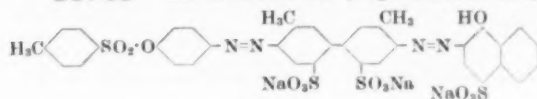


5-Amino-2,4-xylenesulfonic acid \rightarrow Neville and Winther's acid

3108	under 18690 C.I. Solvent Yellow 21 (<i>Yellow</i>)
	add C.I. Acid Yellow 121 (new entry) (<i>Reddish Yellow</i>)

3180	add
------	-----

23905 C.I. Acid Red 145 (*Bright Yellowish Red*)



6,6'-Disulfo-o-Tolidine \rightarrow Phenol
Neville and Winther's acid
then esterify the phenolic hydroxy group with
p-toluenesulfonyl chloride

Page	Colour Index No.
3206	for 26070★ Disperse Dye (Reddish Yellow) read 26070 C.I. Disperse Yellow 23 (Reddish Yellow)
3298	for 34906★ Acid Dye read 34906 C.I. Acid Brown 216
3325	for 37245★ Azoic Diazo Component read 37245 C.I. Azoic Diazo Component 109

VOLUME 4

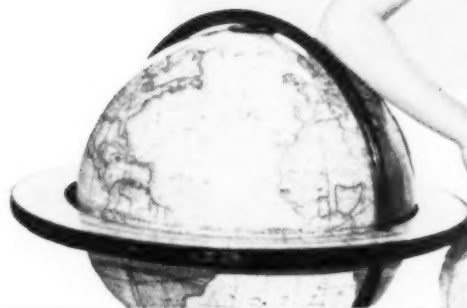
Amendments

Page			
4001	The entry for AAP should read—	AAP	Koppers Company, Inc., Chemicals and Dyestuffs Div., Pittsburgh 19, Pa. (Formerly American Aniline Products, Inc.)
4004		add	TAC Textile Aniline and Chemical Co., 49 Blanchard Street, Lawrence, Mass., U.S.A.
4005		delete	American Aniline Products Inc., New York, N.Y., U.S.A. A unit of Koppers Co. Inc., Pittsburgh, Pa., U.S.A. (AAP) See the new entry for Koppers Company, Inc.
4007		add	Koppers Company, Inc., Chemicals and Dyestuffs Div., Pittsburgh 19, Pa. Formerly American Aniline Products, Inc. (AAP)
4008		add	Textile Aniline and Chemical Co., 49 Blanchard Street, Lawrence, Mass., U.S.A. (TAC)
4265 and 4266	The range of FD&C dyes are out of alphabetical order and should appear after FD Caledon on page 4278		
4439	add Soledon Scarlet B	ICI	Solubilised Vat Dye (Mixture of Soledon Pink FF and Soledon Orange R)

BRADSYN

NON-IONIC SOFTENERS are

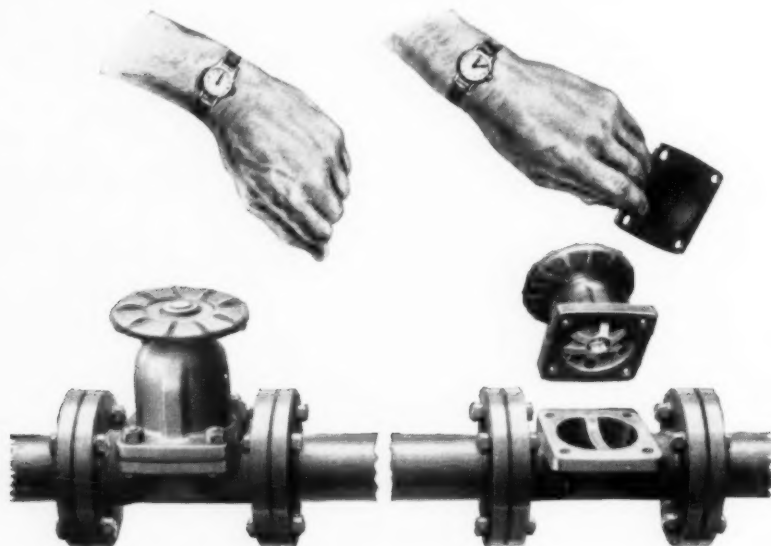
FINISHES in their own right



Used alone, Bradsyn non-ionic softeners impart better handle and prolong the life of the garment. They coat each fibre in durable polyethylene which improves the inter-fibre lubrication, thereby reducing sewing-needle cutting and improving the tear resistance and abrasion resistance. The three grades of Bradsyn offer a choice of sleek, intermediate or dry-silky handle. Bradsyns may be used alone or in conjunction with any of the popular resin and other finishes. *Write for details and samples to **Hickson & Welch Ltd.**, Castleford, Yorkshire.*

Garment by Marks & Spencers Ltd.

EVERY FIBRE IS BETTER FOR BRADSYN



DIFFERENT -- to simplify and
to cut the cost of maintenance



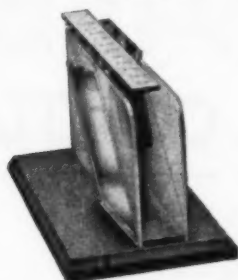
No seats to grind. No glands
to pack. By the simple 10
minute* operation of removing
bonnet and changing the dia-
phragm the valve is restored
'as new' without disturbing
pipeline

** Less for smaller valves, longer for large sizes
— but still the quickest reconditioning known*



FINISHERS

Stiffness



The "SHIRLEY" Stiffness Tester enables stiffness, handle and drape to be expressed in terms of numerical values. The finisher is able to record these values which are available for future use when repeats are required.

Please send for Leaflet SDL/3aY

SHIRLEY DEVELOPMENTS LIMITED

40 KING STREET WEST MANCHESTER 3

Telephone DEAnsgate 5926 and 8182

Combined Reports of the Committees on the Dyeing Properties of Direct Cotton, Vat, and Wool Dyes

Price 5/-



Orders should be sent to the
SOCIETY OF DYERS AND COLOURISTS
19 PICCADILLY BRADFORD 1
YORKSHIRE

Telephone Dudley Hill 253 and 254 (Private Branch Exchange)

Telegrams BISULPHITE BRADFORD

J B WILKINSON (CHEMICALS) LTD

ESTABLISHED 1882

Manufacturers of CHEMICALS for DYERS, BLEACHERS,
TANNERS, TEXTILES and all INDUSTRIAL PURPOSES

DUDLEY HILL CHEMICAL WORKS BRADFORD 4

ALSO LOCAL STOCKISTS OF A LARGE RANGE OF ICI PRODUCTS

The Certificate of the

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE

has been awarded to

AMOA CHEMICAL COMPANY LTD

for their

GOLDFINCH JELLY HAND CLEANSER

The ideal hand cleanser for use in all mills, factories, workshops for a rapid and thorough
cleansing of the hands

Removes oil, grease, swarf, grime, ink and many dye stains
As gentle on the hands as the Goldfinch is gentle in all things

Telephone Hinckley 3725

COLNE VALE

DYE & CHEMICAL CO LTD

MANUFACTURERS OF

BISMARCK BROWN R and Y
Conc. and Base
PURE CHRYSOIDINE Y D and
R D and Base
INDULINE (Water Soluble)
INDULINE (Spirit Soluble)
INDULINE BASE
NIGROSINE (Water Soluble)

NIGROSINE (Spirit Soluble)
NIGROSINE BASE
BASIC MAGENTA
Pdr. and Cryst.
ROSANILINE BASE
ACID MAGENTA Conc.
HELVETIA BLUE Conc.
PURE SOL. BLUE 3 B Conc.

SOLUBLE BLUE R S Conc.
SOLUBLE BLUE A Conc.
INK BLUE N and B N
SOLUBLE BLUE Special Conc.
SPIRIT BLUE
INDIGO CARMINE C V Ex.
LAUNDRY BLUES
METACHROME MORDANT

Also full range of ACID, BASIC, DIRECT and CHROME COLOURS
Samples and Prices will be forwarded on application

MILNSBRIDGE HUDDERSFIELD

Telegrams ANILINE HUDDERSFIELD

Telephone Milnsbridge 3

CHAS FORTH & SON

LIMITED

CHEMICALS

for Dyers & Bleachers

ACIDS ALKALIES SOAPS



DYESTUFFS

for all purposes

DYEWOOD EXTRACTS HEMATINES

NEW BASFORD
NOTTINGHAM

Telephone 75147 & 75148
Code A B C 5th Edition

Telegrams
DELTA NOTTINGHAM

sufatone
paste

a new product ...

is recommended to assist in the
dyeing of yarn with fast milling
colours, to promote a fine handle to
the processed yarn, and avoid
uneven dyeing

Please write for sample and particulars

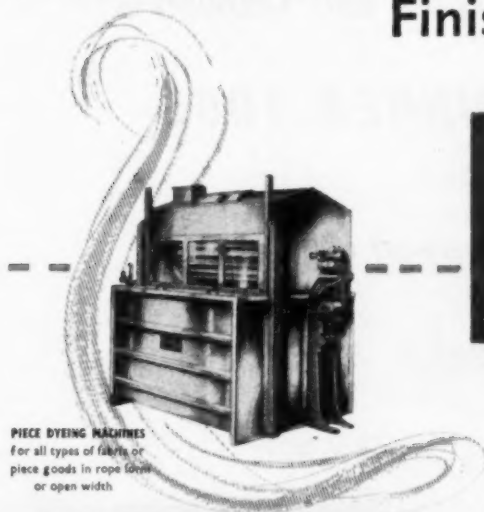
STANDARD CHEMICAL COMPANY

(HORSFIELD BROTHERS LTD)

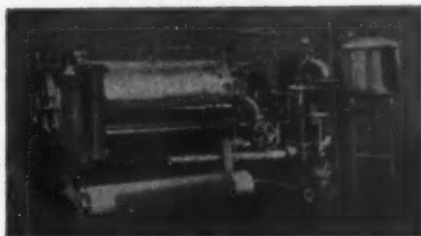
CHEADLE CHESHIRE

Telephone Gatley 5261

PEGG Scouring, Dyeing and Finishing Machines...

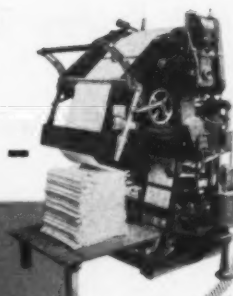


PIECE DYEING MACHINES
for all types of fabric or
piece goods in rope form
or open width

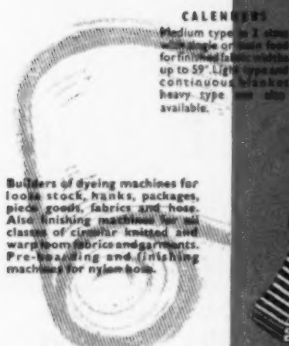


PRESSURISED-SCOURING, BLEACHING AND DYEING MACHINE.
for knitted and woven
fabrics on BEAM Open type
for atmospheric temper-
atures and closed type for
temperatures up to 130°C.

... *for* **Fabrics**
and **Piece Goods**



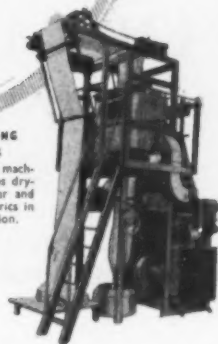
**FABRIC FINISHING
MACHINES**
The automatic Bromac
machine imparts a luxury
finish to knitted fabrics



CALENDERS
Medium type in 2 sizes
with single or double feed
for finished fabric widths
up to 59". Light type and
continuous breakers
heavy type also
available.



**FABRIC DRYING
MACHINES**
The Pegg-Pasold mach-
ine for continuous dry-
ing of all circular and
warp knitted fabrics in
a relaxed condition.



Built within the Bentley Group by
SAMUEL PEGG & SON LTD.
BARKBY ROAD, LEICESTER, ENGLAND
TELEPHONE 46951 TELEGRAMS 'PULSATOR'

SP 7

We are exhibiting at the Third International Textile Machinery Exhibition, Milan, 12 to 21 September 1959

Advance Announcement

The Society of Dyers and Colourists

ANNUAL DINNER 1960

and

Annual General Meeting

Queens Hotel Leeds

Friday 29 April 1960

The Society of Dyers and Colourists

NOTES FOR A
LABORATORY COURSE IN DYEING

by Charles Hugh Giles Ph.D F.R.I.C F.S.D.C

Senior Lecturer in Chemical Technology
Glasgow Royal College of Science and Technology

This manual is intended as a guide to practical instruction
in the principles of dyeing for students, especially those who
are unable to attend a recognised course in dyeing

Price 17s 6d

Postage 8d

Available from

THE SOCIETY OF DYERS AND COLOURISTS
DEAN HOUSE · 19 PICCADILLY · BRADFORD · YORKSHIRE

Buying detergents in bulk . . .



. . . from Shell earns rebates which are well worth having. It is by far the best way of taking supplies of anionic TEEPOL and nonionic NONIDET. Tanks can be provided and life is easier all round.



SHELL CHEMICAL COMPANY LIMITED

In association with Petrochemicals Limited and Styrene Products Limited

<i>Regional Offices</i> LONDON	Norman House 105-9 Strand WC2 Telephone TEMple Bar 4455
MANCHESTER	144-6 Deansgate 3 Telephone DEANSgate 2411
BIRMINGHAM	14-20 Corporation Street 2 Telephone MIDland 6954
GLASGOW	48-54 West Nile Street C1 Telephone CITY 3391
BELFAST	16-20 Rosemary Street Telephone BELfast 26094
DUBLIN	33-34 Westmoreland Street Telephone DUBLIN 72114

"TEEPOL" and "NONIDET" are Registered Trade Marks

The Journal of the Society of Dyers and Colourists

(Subscription rates for non-members £5 5s 0d per annum, post free)
(Abstracts section only printed on one side of paper—£2 0s 0d per annum)

NOTICE TO MEMBERS AND SUBSCRIBERS

Readers requiring *general information* regarding the Official Notices, List of Officers of the Society, etc., should consult pages 1-10 of the January 1959 and pages 341-348 of the July 1959 issues of the *Journal*, or write to *The General Secretary*, The Society of Dyers and Colourists, Dean House, 19 Piccadilly, Bradford 1, Yorkshire (Telephone Bradford 25138). *Editorial Communications* should be addressed to *The Editor*, at the same address

Forthcoming Papers

The following papers have been accepted by the Publications Committee, and will appear in future issues of the *Journal*—

LECTURES

Emulsion Thickenings—Possibilities in Textile Printing

T. L. Dawson

Fast Dyeings on Wool—Cellulosic Unions

D. R. Lemin and J. K. Collins

FORTHCOMING MEETINGS OF THE SOCIETY

Friday, 23rd October 1959

LONDON SECTION. Seventh London Lecture. Waldorf Hotel, London W.C.2. 7 p.m.

Friday, 12th February 1960

LONDON SECTION. Annual Dinner and Dance. Waldorf Hotel, London W.C.2. 7 for 7.30 p.m.

Patents	Designs	Trade Marks
W P THOMPSON & CO		
CHARTERED PATENT AGENTS		
50 LINCOLN'S INN FIELDS LONDON WC 2 Holborn 2174		12 CHURCH STREET LIVERPOOL 1 Royal 3172-3



HERBERT
LEUPIN

Brilliant Alizarine Milling Dyes

Homogeneous Sandoz specialties for the dyeing and printing of wool, natural silk and synthetic polyamide fibres and applied in a neutral or weakly acid bath. High light fastness. Excellent fastness to processing and wear. Withstands chrome and of value for shading metal complex and chrome colours. Suitable for high temperature dyeing.

Brilliant Alizarine Milling Green 2GL

Very pure yellowish green. Exhausts on wool from a neutral bath. Suitable for union dyeing. Compatible with metal complex dyes.



Protected by patent rights in many industrial countries.

**Sandoz Products Ltd
Bradford**



Versatile **PROCLONS** *the ideal blue reactive dyes*



THE JOURNAL OF THE Society of Dyers and Colourists

Volume 100

JULY 1989

Number 1

THE SOCIETY OF DYERS AND COLOURISTS

THE COUNCIL OF THE SOCIETY

President: Sir John H. H. H. H.

Vice-President: Mr. J. H. H. H.

President Elect: Mr. J. H. H. H.

Vice-President Elect: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.

President Emeritus: Mr. J. H. H. H.

Vice-President Emeritus: Mr. J. H. H. H.



Versatile **PROCIONS**[®] — *the original fibre-reactive dyes*

X15

Ideal for swim wear,
 Procions give brilliant shades of good light-
 and wet-fastness. Selected Procions
 are fast to chlorinated water.
 DYE by all processes from simple, cold,
 batchwise to continuous high speed.
 PRINT by very simple processes.

® Patented in the main industrial countries.

Full information on request



IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON SW1 ENGLAND

THE JOURNAL

OF THE

Society of Dyers and Colourists

Volume 75 Number 7

JULY 1959

Issued Monthly

THE SOCIETY OF DYERS AND COLOURISTS

THE COUNCIL OF THE SOCIETY

President

JOHN BOULTON M.Sc.Tech. F.R.I.C. F.T.I. F.S.D.C.
Chairman of Council

President-elect

F. M. STEVENSON M.Sc. J.P.

Past Presidents serving on Council

H. H. BOWEN F.S.D.C.

CLIFFORD PAINE B.Sc. F.R.I.C. F.S.D.C.

FRED SMITH F.S.D.C.

Vice-presidents

J. BARRITT O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.

R. J. HANNAY B.Sc. F.R.I.C. F.T.I. F.S.D.C.

Vice-chairman of Council

R. C. OAKLEY O.St.J.

W. PENN F.T.I. F.S.D.C.

H. A. TURNER M.Sc. F.R.I.C. F.T.I. F.S.D.C.

T. VICKERSTAFF M.Sc. Ph.D. F.T.I. F.S.D.C.

Honorary Treasurer

A. WADDINGTON A.C.A.

Mortimer Peel & Co. Ltd., Castle Dyeworks,
Parma Street, Bradford 5, Yorkshire

Honorary Secretary

L. MORTON WOOD

Norman Wood & Son Ltd., Crown Dyeworks,
Birkshall Lane, Bradford 4, Yorkshire

Ordinary Members

G. B. ANGUS B.Sc. A.R.I.C. A.I.R.I. A.M.B.I.M. F.S.D.C.

C. L. BIRD M.Sc. F.R.I.C. F.S.D.C.

A. W. CARPENTER

S. R. COCKETT M.Sc.Tech. A.M.C.T. F.R.I.C. F.T.I.

G. T. DOUGLAS Ph.D. F.S.D.C.

F. FARRINGTON B.Sc. F.R.I.C. F.S.D.C.

N. HAMER A.M.C.T. F.S.D.C.

H. HAMPSON F.S.D.C.

J. G. HOPKINSON M.A. A.R.I.C.

L. PETERS M.Sc. Ph.D.

J. W. REIDY M.A.(Com.) F.R.I.C. F.T.I. F.S.D.C.

A. E. STUBBS M.Sc. Ph.D. F.R.I.C. F.T.I. F.S.D.C.

Chairman of the Publications Committee

A. THOMSON A.R.I.C. F.S.D.C.

Perkin Fund Trustee

W. R. MATHERS

Chairmen of Sections

G. H. BINNS

A. S. CLULEY F.T.I.

W. GRAHAM

J. G. B. MCCALLUM

J. RANKIN

H. A. TURNER M.Sc. F.R.I.C. F.T.I. F.S.D.C.

G. WELFORD Ph.D.

R. WOODS F.S.D.C.

Honorary Secretaries of Sections

F. ATTACK

J. N. LITTLER

K. MELDRUM B.Sc. A.R.I.C.

J. PORTER

J. RAYMENT

ESMÉE SMITH (Miss)

H. W. TAYLOR A.M.C.T.

H. TURNER

Honorary Patent Agent

L. E. JONES M.Sc. F.R.I.C. C.P.A.

Cooper's Buildings, Church Street, Liverpool 1

Editor and Technical Officer

C. J. W. HOOPER Ph.D. D.I.C. A.R.C.S.

General Secretary

J. W. NICHOLLS F.C.I.S.

Offices of the Society

Dean House, 19 Piccadilly, Bradford 1, Yorkshire
Telephone Bradford 25138 (3 lines)

PAST PRESIDENTS

1884 Henry Ripley J.P.	1920 The Right Hon. Lord Moulton P.C. K.C.B. G.B.E. F.R.S.
1886 F. H. Bowman D.Sc. F.I.C. F.R.S.E.	
1888 Jas. Sharp	1921 Sir H. Sutcliffe Smith
1890 J. R. Armitage J.P.	1923 S. J. Pentecost
1891 Henry Sutcliffe J.P.	1925 Ernest Hickson
1893 Robt. Holliday	1927 H. Levinstein M.Sc. Ph.D. F.R.I.C. F.S.D.C.
1895 Jer. Whitaker	1929 Cyril Eastman
1897 J. B. Moorhouse J.P.	1931 Lennox B. Lee
1899 H. Grandage	1933 Thorp Whitaker O.B.E.
1901 C. Dreyfus Ph.D.	1934 Arthur G. Green M.Sc. F.I.C. F.R.S.
1903 C. R. Hindley J.P.	1936 Gerald T. Moody D.Sc.
1905 Sir Thomas Wardle J.P.	1937 Frederick F. Flinn J.P.
1907 Sir William Henry Perkin LL.D. Ph.D. D.Sc. F.R.S.	1939 C. J. T. Cronshaw D.Sc. F.R.I.C. M.I.Chem.E. F.T.I. F.R.S.E. F.S.D.C.
1908 Prof. Raphael Meldola F.I.C. F.R.S.	1946 C. M. Whittaker D.Sc. F.T.I. F.S.D.C.
1910 The Right Hon. Lord Cawley of Prestwich	1948 G. E. Holden C.B.E. M.Sc. F.R.I.C.
1912 George Douglas	1950 F. Scholefield M.B.E. M.Sc. F.R.I.C. F.T.I. F.S.D.C.
1914 Rufus D. Pullar J.P.	1952 H. H. Bowen F.S.D.C.
1916 Alfred Rée Ph.D.	1953 F. L. Goodall M.Sc. F.R.I.C. F.S.D.C.
1918 Charles F. Cross F.R.S.	1954 Fred Smith F.S.D.C.
	1956 Clifford Paine B.Sc. F.R.I.C. F.S.D.C.

COMMITTEES

The President, Honorary Secretary, and Honorary Treasurer are *ex officio* members of all Committees and Subcommittees

Finance and General Purposes

Chairman A. WADDINGTON A.C.A. (Honorary Treasurer)

G. B. Angus B.Sc. A.R.I.C. A.I.R.I. A.M.B.I.M. F.S.D.C.	W. Penn F.T.I. F.S.D.C.
J. Barritt O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.	J. W. Reidy M.A.(Com.) F.R.I.C. F.T.I. F.S.D.C.
N. Hamer A.M.C.T. F.S.D.C.	Fred Smith F.S.D.C.
R. J. Hannay B.Sc. F.R.I.C. F.T.I. F.S.D.C.	F. M. Stevenson M.Sc. J.P.
J. G. Hopkinson M.A. A.R.I.C.	Chairman of the Publications Committee

Publications

Chairman A. THOMSON A.R.I.C. F.S.D.C.

R. S. Asquith M.A. B.Sc. Ph.D.	C. H. Giles Ph.D. D.Sc. F.R.I.C. F.S.D.C.
E. Atherton Ph.D. F.Inst.P.	R. Grice
J. Barritt O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.	K. A. Hilton B.Sc.Tech. A.M.C.T. A.R.I.C.
C. L. Bird M.Sc. F.R.I.C. F.S.D.C.	A. Johnson M.Sc.Tech. Ph.D.
H. Blackshaw F.S.D.C.	W. S. Miller Ph.D.
E. E. Bowker A.M.C.T.	L. Peters M.Sc. Ph.D.
G. G. Bradshaw M.Sc. A.R.I.C. F.S.D.C.	Prof. R. H. Peters Ph.D.
C. O. Clark F.T.I. F.S.D.C.	J. Rankin
S. R. Cockett M.Sc.Tech. A.M.C.T. F.R.I.C. F.T.I.	C. B. Stevens Ph.D. F.S.D.C.
C. W. Edwards B.Sc.	A. E. Stubbs M.Sc. Ph.D. F.R.I.C. F.T.I. F.S.D.C.
R. L. Elliott Ph.D. F.R.I.C. F.T.I. F.S.D.C.	H. A. Turner M.Sc. F.R.I.C. F.T.I. F.S.D.C.

Honorary Secretary J. V. SUMMERSGILL B.Sc. F.S.D.C.

The Geigy Co. Ltd., 4 Vincent Street, Bradford 1, Yorkshire

TEXTBOOKS AND MONOGRAPHS SUBCOMMITTEE

Chairman of the Publications Committee	C. O. Clark F.T.I. F.S.D.C. (Convener)
Honorary Secretary of the Publications Committee	R. L. Elliott Ph.D. F.R.I.C. F.T.I. F.S.D.C.
C. L. Bird M.Sc. F.R.I.C. F.S.D.C.	C. H. Giles Ph.D. D.Sc. F.R.I.C. F.S.D.C.
G. G. Bradshaw M.Sc. A.R.I.C. F.S.D.C.	H. A. Turner M.Sc. F.R.I.C. F.T.I. F.S.D.C.

ABSTRACTORS

R. Aicher (Miss)	W. J. Marshall B.Sc. M.R.I. A.R.I.C.
R. B. Bentley B.Sc. F.R.I.C.	P. G. Midgley M.Sc. A.R.I.C.
J. E. Bloor B.A.	W. P. Mills B.Sc.
W. G. Cameron Ph.D.	W. R. Moore M.B.E. Ph.D. F.R.I.C.
E. Chadwick M.Sc.Tech. A.R.I.C.	L. Peters M.Sc. Ph.D.
C. O. Clark F.T.I. F.S.D.C.	C. H. Reece Ph.D. A.R.I.C.
S. R. Cockett M.Sc.Tech. A.M.C.T. F.R.I.C. F.T.I.	W. K. Rhodes A.R.I.C.
J. W. Duarte B.Sc. A.R.I.C.	P. H. Shaw A.R.I.C. A.S.D.C.
S. B. Dyson B.Sc.	P. T. Speakman M.A. D.Phil.
J. C. Fletcher B.Sc. A.R.I.C.	E. Stead M.Sc. F.S.D.C.
H. H. Hodgson M.A. Ph.D. F.R.I.C. F.S.D.C.	C. B. Stevens Ph.D. F.S.D.C.
S. M. Jaekel B.Sc. A.R.C.S. A.R.I.C.	L. A. Telesz B.Sc. A.R.I.C. F.T.I.
A. Johnson M.Sc.Tech. Ph.D.	E. Thornton B.Sc. A.R.I.C.
G. J. Kakabadse Dr.-Ing.	E. V. Truter Ph.D. D.I.C. A.R.C.S.
G. E. Key F.T.I.	T. Z. Wozniczka A.T.I.

Colour Index Editorial Board*Chairman* J. BARRITT O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.

J. G. Grundy F.S.D.C.

M. Lapworth B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.

A. Thomson A.R.I.C. F.S.D.C.

W. E. Wood

Honorary Secretary C. O. CLARK F.T.I. F.S.D.C.**Diplomas***Chairman* C. PAINE B.Sc. F.R.I.C. F.S.D.C.

J. Boulton M.Sc.Tech. F.R.I.C. F.T.I. F.S.D.C.

A. W. Carpenter

C. O. Clark F.T.I. F.S.D.C.

A. W. Doyle M.Sc.Tech. A.M.C.T. F.R.I.C. F.S.D.C.

W. A. Edwards F.T.I. F.S.D.C.

R. L. Elliott Ph.D. F.R.I.C. F.T.I. F.S.D.C.

C. H. Giles Ph.D. D.Sc. F.R.I.C. F.S.D.C.

N. Hamer A.M.C.T. F.S.D.C.

F. Jordinson M.Sc. F.R.I.C. F.S.D.C.

W. L. Lead Ph.D. F.R.I.C.

W. Penn F.T.I. F.S.D.C.

J. W. Reidy M.A.(Com.) F.R.I.C. F.T.I. F.S.D.C.

F. Scholefield M.B.E. M.Sc. F.R.I.C. F.T.I. F.S.D.C.

Fred Smith F.S.D.C.

Prof. J. B. Speakman D.Sc. F.R.I.C. F.T.I. F.S.D.C.

C. B. Stevens Ph.D. F.S.D.C.

F. M. Stevenson M.Sc. J.P.

A. E. Stubbs M.Sc. Ph.D. F.R.I.C. F.T.I. F.S.D.C.

J. V. Summersgill B.Sc. F.S.D.C.

H. A. Turner M.Sc. F.R.I.C. F.T.I. F.S.D.C.

T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.

J. S. Ward B.Sc.

C. C. Wilcock A.R.T.C.S. F.T.I. F.S.D.C.

E. Wilson B.A. F.S.D.C.

EXAMINATIONS BOARD*Chairman* C. O. CLARK F.T.I. F.S.D.C.

R. L. Elliott Ph.D. F.R.I.C. F.T.I. F.S.D.C.

W. Penn F.T.I. F.S.D.C.

C. B. Stevens Ph.D. F.S.D.C.

J. V. Summersgill B.Sc. F.S.D.C.

H. A. Turner M.Sc. F.R.I.C. F.T.I. F.S.D.C.

T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.

The Worshipful Company of Dyers Research Medal

C. L. Bird M.Sc. F.R.I.C. F.S.D.C.

C. J. T. Cronshaw D.Sc. F.R.I.C. M.I.Chem.E. F.T.I.

F.R.S.E. F.S.D.C. (*representing the Company*)

L. Peters M.Sc. Ph.D.

A. E. Stubbs M.Sc. Ph.D. F.R.I.C. F.T.I. F.S.D.C.

H. A. Turner M.Sc. F.R.I.C. F.T.I. F.S.D.C. (*Convener*)

T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.

J. S. Ward B.Sc.

The Society of Dyers and Colourists Medals*Chairman* L. M. WOOD (*Honorary Secretary of the Society*)

J. Barritt O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.

F. Jordinson M.Sc. F.R.I.C. F.S.D.C.

A. P. Kershaw

R. C. Oakley

R. A. Peel F.S.D.C.

W. Penn F.T.I. F.S.D.C.

J. Porter

G. S. J. White M.A. F.T.I. F.S.D.C.

*Convener of the Worshipful Company of Dyers Research Medal Committee***The Worshipful Company of Feltmakers Research Medal**

T. Barr Ph.D. F.R.I.C. F.T.I. F.S.D.C.

J. Begley F.I.L.

A. B. D. Cassie C.B.E. M.A. Ph.D. D.Sc. F.Inst.P.

G. W. Gunter

J. W. Reidy M.A.(Com.), F.R.I.C. F.T.I. F.S.D.C.

W. S. Shaw Ph.D. D.Sc. F.R.I.C. F.T.I.

Prof. J. B. Speakman D.Sc. F.R.I.C. F.T.I. F.S.D.C. (*Convener*)

T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.

George Douglas Lecture*The President**The Immediate Past President or the President-elect**The Chairman of the Publications Committee**A Representative of the Bradford Dyers' Association Ltd.*
(J. G. Evans M.Sc.Tech.)**Mercer Lecture***Chairman* J. BARRITT O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.

H. Corteen M.Sc. F.Inst.P. F.T.I.

F. V. Davis B.Sc. F.R.I.C. F.T.I.

G. T. Douglas Ph.D. F.S.D.C.

H. Hampson F.S.D.C.

S. M. Neale D.Sc.

J. W. Reidy M.A.(Com.) F.R.I.C. F.T.I. F.S.D.C.

*Chairman of the Publications Committee***International Relations***Chairman* G. B. ANGUS B.Sc. A.R.I.C. A.I.R.I. A.M.B.I.M. F.S.D.C.

J. Barritt O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.

H. Blackburn

J. Boulton M.Sc.Tech. F.R.I.C. F.T.I. F.S.D.C.

E. E. Bowker A.M.C.T.

G. H. Carnall A.C.I.S.

H. Corteen M.Sc. F.Inst.P. F.T.I.

P. W. Cunliffe Ph.D. F.R.I.C. F.T.I. F.S.D.C.

J. G. Evans M.Sc.Tech.

A. D. Ferns

R. K. Fourness B.Sc. F.R.I.C. F.S.D.C.

J. F. Gaunt Ph.D. F.T.I.

J. G. Grundy F.S.D.C.

J. Holt F.S.D.C.

A. F. Kertess Ph.D. F.T.I. F.S.D.C.

W. Mathers

C. Paine B.Sc. F.R.I.C. F.S.D.C.

W. Penn F.T.I. F.S.D.C.

L. Peters M.Sc. Ph.D.

F. M. Stevenson M.Sc.

A. E. Stubbs M.Sc. Ph.D. F.R.I.C. F.T.I. F.S.D.C.

K. Swift

W. Taussig F.T.I. F.S.D.C.

T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.

G. S. J. White M.A. F.T.I. F.S.D.C.

Fastness Tests Co-ordinating Committee**Chairman K. McLAREN B.Sc. F.R.I.C. F.S.D.C.*

G. B. Angus B.Sc. A.R.I.C. A.I.R.I. A.M.B.I.M. F.S.D.C.	W. S. Miller Ph.D.
J. Boulton M.Sc.Tech. F.R.I.C. F.T.I. F.S.D.C.	E. Stead M.Sc. F.S.D.C.
G. G. Bradshaw M.Sc. A.R.I.C. F.S.D.C.	J. V. Summersgill B.Sc. F.S.D.C.
P. W. Cunliffe Ph.D. F.R.I.C. F.T.I. F.S.D.C.	T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.
J. G. Grundy F.S.D.C.	E. Wilson B.A. F.S.D.C.

**Honorary Secretary ESMÉE SMITH (Miss)*

Flat 16, Foxhill, Weetwood Lane, Leeds 16

** The Chairman and the Honorary Secretary of the Co-ordinating Committee are ex officio members of all Subcommittees***ALKALINE MILLING FASTNESS SUBCOMMITTEE***Chairman E. WILSON B.A. F.S.D.C.*

G. G. Bradshaw M.Sc. A.R.I.C. F.S.D.C.	F. F. Elsworth Ph.D. A.R.I.C. F.S.D.C.
--	--

*Honorary Secretary J. V. SUMMERSGILL B.Sc. F.S.D.C.***BURNT-GAS FUMES FASTNESS SUBCOMMITTEE***Chairman G. T. DOUGLAS Ph.D. F.S.D.C.*

D. Clough B.Sc.	E. Stead M.Sc. F.S.D.C.
J. G. Grundy F.S.D.C.	J. Tankard M.Sc. F.T.I. F.Inst.P.
E. Stanley M.Sc.Tech.	E. Wilson B.A. F.S.D.C.

*Honorary Secretary J. G. GRAHAM B.Sc.***LIGHT FASTNESS SUBCOMMITTEE***Chairman K. McLAREN B.Sc. F.R.I.C. F.S.D.C.*

B. S. Cooper B.Sc. F.Inst.P.	G. S. Hibbert M.Sc. F.S.D.C.
P. W. Cunliffe Ph.D. F.R.I.C. F.T.I. F.S.D.C.	F. W. Lindley Ph.D.
T. F. Foulkes A.M.C.T. A.T.I.	A. H. Little B.Sc. F.R.I.C. F.T.I.
J. G. Grundy F.S.D.C.	J. Tankard M.Sc. F.T.I. F.Inst.P.
J. C. Guthrie M.Sc. F.T.I. F.Inst.P.	

*Honorary Secretary R. H. RICKETTS B.Sc. A.R.C.S.***PERSPIRATION FASTNESS SUBCOMMITTEE***Chairman E. WILSON B.A. F.S.D.C.*

F. F. Elsworth Ph.D. A.R.I.C. F.S.D.C.	J. V. Summersgill B.Sc. F.S.D.C.
--	----------------------------------

*Honorary Secretary G. G. BRADSHAW M.Sc. A.R.I.C. F.S.D.C.***FASTNESS TO HEAT TREATMENTS SUBCOMMITTEE***Chairman H. R. HADFIELD M.Sc.Tech.*

W. R. Beath B.Sc.Tech.	H. W. Peters B.Sc.
S. N. Bradshaw	E. Stead M.Sc. F.S.D.C.
A. Elkin	E. Wilson B.A. F.S.D.C.
T. Geeson	J. R. Wyld F.T.I.
G. D. Myers M.Sc.Tech.	

*Honorary Secretary H. SEAMAN B.A.***WASHING FASTNESS SUBCOMMITTEE***Chairman J. G. GRUNDY F.S.D.C.*

P. R. Dawson	J. S. Ingham M.Sc. F.R.I.C. F.S.D.C.
J. F. Gaunt Ph.D. F.R.I.C. F.T.I.	W. Shaw Ph.D. A.R.I.C.
I. Glasman A.T.I.	E. Wilson B.A. F.S.D.C.
F. R. Hill	

*Honorary Secretary D. HUDSON***Preservation of Historical Records***Chairman C. O. CLARK F.T.I. F.S.D.C.*

R. Brightman M.Sc. F.R.I.C. A.C.G.F.C.	R. A. Peel F.S.D.C.
S. R. Cockett M.Sc.Tech. A.M.C.T. F.R.I.C. F.T.I.	K. G. Ponting
G. G. Hopkinson A.R.I.C. F.S.D.C.	J. W. Reidy M.A.(Com.) F.R.I.C. F.T.I. F.S.D.C.
J. G. Hurst	W. S. Stansfield F.T.I.
L. E. Morris	A. Thomson A.R.I.C. F.S.D.C.

Terms and Definitions*Chairman S. R. COCKETT M.Sc.Tech. A.M.C.T. F.R.I.C. F.T.I.*

H. à Brassard F.S.D.C.	L. L. Lloyd Ph.D. F.R.I.C. F.S.D.C.
*E. Butterworth M.Sc.Tech. F.Inst.P. F.T.I.	W. S. Miller Ph.D.
C. O. Clark F.T.I. F.S.D.C.	E. Stead M.Sc. F.S.D.C.
N. Harner A.M.C.T. F.S.D.C.	T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.
K. A. Hilton B.Sc.Tech. A.R.I.C. A.M.C.T.	J. S. Ward B.Sc.
B. Kramrich F.R.I.C. F.T.I. F.S.D.C.	

** Representing the Textile Institute*

Data on Identification of Dyes on Textile Fibres*Chairman C. B. STEVENS Ph.D. F.S.D.C.*

J. F. Barton AM.C.T.
 E. Clayton F.R.I.C. F.S.D.C.
 G. S. Egerton M.Sc. Ph.D. F.T.I.
 R. L. Elliott Ph.D. F.R.I.C. F.T.I. F.S.D.C.
 C. H. Giles Ph.D. D.Sc. F.R.I.C. F.S.D.C.
 K. A. Hilton B.Sc.Tech. A.R.I.C. AM.C.T.
 A. Johnson M.Sc.Tech. Ph.D.

F. Jordinson M.Sc. F.R.I.C. F.S.D.C.
 W. L. Lead Ph.D. F.R.I.C.
 L. Morris B.Sc.Tech. A.R.I.C.
 H. Newton A.T.I.
 H. E. Nursten Ph.D. F.R.I.C.
 G. E. Styan B.Sc. A.R.I.C. F.S.D.C.
 L. A. Telesz B.Sc. A.R.I.C. F.T.I.

Representatives on Joint Committees with the Textile Institute**STANDING COMMITTEE**

J. Boulton M.Sc.Tech. F.R.I.C. F.T.I. F.S.D.C.
 R. J. Hannay B.Sc. F.R.I.C. F.T.I. F.S.D.C.
 J. W. Reidy M.A.(Com.) F.R.I.C. F.T.I. F.S.D.C.

F. Scholefield M.B.E. M.Sc. F.R.I.C. F.T.I. F.S.D.C.
 Fred Smith F.S.D.C.
 H. A. Thomas Ph.D. F.R.I.C. F.T.I. F.S.D.C.

REVIEW OF TEXTILE PROGRESS*Chairman G. S. J. WHITE M.A. F.T.I. F.S.D.C.*

J. T. Marsh M.Sc. F.R.I.C. F.T.I. F.S.D.C.
 C. B. Stevens Ph.D. F.S.D.C.
 H. A. Turner M.Sc. F.R.I.C. F.T.I. F.S.D.C.

Prof. C. S. Whewell Ph.D. F.R.I.C. F.T.I. F.S.D.C.
 G. M. Williams B.Sc.Tech. AM.C.T. F.S.D.C.

MOTH AND DERMESTID BEETLE PROOFING*Chairman R. J. HANNAY B.Sc. F.R.I.C. F.T.I. F.S.D.C.*

J. Barritt O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.
 R. Burgess M.Sc. Ph.D.
 G. V. B. Herford C.B.E. M.Sc. B.A.

Prof. C. S. Whewell Ph.D. F.R.I.C. F.T.I. F.S.D.C.
 F. G. S. Whitfield D.I.C. M.Biol.

Joint Committee with the Clothing Institute

H. W. Best-Gordon
 A. Breare M.Sc. F.R.I.C. F.S.D.C.
 W. A. Edwards F.T.I. F.S.D.C.

J. M. Goodall F.S.D.C.
 E. Wilson B.A. F.S.D.C.

Representatives on External Bodies**BRADFORD INSTITUTE OF TECHNOLOGY—****GOVERNING BODY**

L. Morton Wood

BRITISH BIOLOGICAL STAINS COMMISSION

Prof. W. Bradley Ph.D. D.Sc. F.R.I.C. F.S.D.C.

BRITISH STANDARDS INSTITUTION—**COLOURING MATTERS FOR USE IN FOODSTUFFS**

H. W. Ellis Ph.D. A.R.C.S. A.R.I.C. F.S.D.C.

COTTON INDUSTRY COMMITTEE

J. M. Preston D.Sc. F.R.I.C. F.T.I. F.S.D.C.

FLAMMABILITY OF FABRICS

E. G. Heighway-Bury A.M.B.I.M.

LETTERPRESS INKS (FOUR-COLOUR AND THREE-COLOUR)

H. W. Ellis Ph.D. A.R.C.S. A.R.I.C. F.S.D.C.

LINEN INDUSTRY COMMITTEE

J. A. Young F.S.D.C.

METHODS OF TEST FOR SURFACE-ACTIVE AGENTS

R. C. Tarring

PROOFED CLOTHING—DYEING AND FINISHING PROCESSES COMMITTEE

R. J. Hannay B.Sc. F.R.I.C. F.T.I. F.S.D.C.

PYRIDINE

H. W. Ellis Ph.D. A.R.C.S. A.R.I.C. F.S.D.C.

RAYON INDUSTRY COMMITTEE

C. C. Wilcock A.R.T.C.S. F.T.I. F.S.D.C.

ROTPROOFING OF TEXTILES OTHER THAN CLOTHING

E. Race Ph.D. F.R.I.C. F.T.I. F.S.D.C.

SILK INDUSTRY COMMITTEE

E. S. Beton B.Sc. F.R.I.C.

STANDARDS FOR ANODIC OXIDATION FINISHES FOR ALUMINIUM AND ALUMINIUM ALLOYS SUB-COMMITTEE AND PANEL

Albert Bratt AM.C.T.

STEERING COMMITTEE T/- 8

P. W. Cunliffe Ph.D. F.R.I.C. F.T.I. F.S.D.C.

TEXTILE DIVISIONAL COUNCIL

H. A. Thomas Ph.D. F.R.I.C. F.T.I. F.S.D.C.

TEXTILE MACHINERY INDUSTRY COMMITTEE

L. Morris B.Sc.Tech. A.R.I.C.

WASH FASTNESS OF BUTTONS

J. G. Grundy F.S.D.C.

WOOL INDUSTRY COMMITTEE

J. Barritt O.B.E. B.Sc. A.R.C.S. A.R.I.C. F.S.D.C.

CHEMICAL SOCIETY LIBRARY COMMITTEE

T. H. Morton M.Sc. Ph.D. F.T.I. F.S.D.C.

CITY AND GUILDS OF LONDON INSTITUTE—**DYEING ADVISORY COMMITTEE**

R. L. Elliott Ph.D. F.R.I.C. F.T.I. F.S.D.C.

CONSULTATIVE COMMITTEE FOR TEXTILE SUBJECTS

C. Paine B.Sc. F.R.I.C. F.S.D.C.

FARADAY MEMORIAL COMMITTEE

H. W. Ellis Ph.D. A.R.C.S. A.R.I.C. F.S.D.C.

MANCHESTER COLLEGE OF SCIENCE AND TECHNOLOGY,COURT OF GOVERNORS *The President***NATIONAL ILLUMINATION COMMITTEE OF GREAT BRITAIN**

AND THE SUBCOMMITTEE ON COLORIMETRY AND COLOUR

RENDERING K. McLaren B.Sc. F.R.I.C. F.S.D.C.

PARLIAMENTARY AND SCIENTIFIC COMMITTEE

L. Morton Wood

J. Boulton M.Sc.Tech. F.R.I.C. F.T.I. F.S.D.C.

REGIONAL ADVISORY COUNCIL FOR TECHNICAL AND

OTHER FORMS OF FURTHER EDUCATION FOR

MANCHESTER AND DISTRICT—

POST ADVANCED TEXTILES ADVISORY COMMITTEE

T. Vickerstaff M.Sc. Ph.D. F.T.I. F.S.D.C.

POST ADVANCED CHEMISTRY ADVISORY COMMITTEE

H. A. Turner M.Sc. F.R.I.C. F.T.I. F.S.D.C.

ROYAL SOCIETY—**NATIONAL COMMITTEE FOR CHEMISTRY**

J. Boulton M.Sc.Tech. F.R.I.C. F.T.I. F.S.D.C.

ROYAL TECHNICAL COLLEGE, SALFORD—**APPLIED SCIENCES ADVISORY COMMITTEE**

J. W. Reidy M.A.(Com.) F.R.I.C. F.T.I. F.S.D.C.

SOCIETY OF LEATHER TRADES CHEMISTS—**COMMITTEE FOR FASTNESS PROPERTIES OF DYES**

ON LEATHER K. McLaren B.Sc. F.R.I.C. F.S.D.C.

TEXTILE INSTITUTE—**TECHNICAL COMMITTEE "D"**

W. Arnfield AM.C.T. F.T.I. F.S.D.C.

TEXTILE TERMS AND DEFINITIONS COMMITTEE

C. O. Clark F.T.I. F.S.D.C.

UNIFICATION OF TESTING METHODS COMMITTEE

K. McLaren B.Sc. F.R.I.C. F.S.D.C.

R. H. Ricketta B.Sc. A.R.C.S.

YORKSHIRE COUNCIL FOR FURTHER EDUCATION—**COUNTY ADVISORY COMMITTEE FOR CHEMISTRY**

J. G. Hopkinson M.A. A.R.I.C.

COUNTY ADVISORY COMMITTEE FOR TEXTILES

W. R. Mathers

SECTIONS OF THE SOCIETY

HUDDERSFIELD

Chairman G. H. BINNS Vice-chairman A. KLINGER

Committee

H. Boothroyd	G. England	M. Nutton	H. Sellers
N. Brook	F. Jordinson	R. L. Robinson	E. Thornton
J. Calvert	G. Kendall	G. K. Seddon	

Honorary Treasurer C. PARKER, Cliff Head, Honley, Huddersfield

Honorary Secretary H. TURNER, Stoneycroft, Long Lane, Honley, Huddersfield

LONDON

Chairman R. WOODS Vice-chairman C. B. ROYLANCE

Committee

C. Barnett	P. W. Day	L. A. Matthews	C. C. Wilcock
G. W. Bednall	R. Hawthorn	T. H. Morton	G. F. Wood
D. Burgoyne			

Honorary Treasurer F. HARRISON, Ciba Clayton Ltd., Bush House, Aldwych, London W.C.2

Honorary Secretary H. W. TAYLOR, 10 Milton Avenue, Sutton, Surrey

MANCHESTER

Chairman H. A. TURNER Vice-chairman A. S. FERN

Committee

E. E. Bowker	J. Greenwood	H. Hampson	J. W. Reidy
F. V. Davis	H. R. Hadfield	W. R. Leigh	W. Shaw
M. R. Fox	N. Hamer	R. H. Peters	A. K. Taylor

Honorary Secretary K. MELDRUM

Courtaulds Ltd., Research Laboratory, Campbell Street, Droylsden, Manchester

MIDLANDS

Chairman A. S. CLULEY Vice-chairman A. W. CARPENTER

Committee

B. B. Brewer	A. P. Kershaw	C. A. Mills	G. Whitehead
T. E. Charlesworth	W. L. Langton	*W. Penn	D. B. Williamson
D. O. Douglas	W. L. Lead	J. Saunders	J. C. Wright
J. C. Hawley	D. B. McPherson	L. A. Telesz	

(* ex officio member)

Honorary Treasurer R. GREENLEES, 49 Rochester Road, Earlsdon, Coventry

Honorary Secretary J. RAYMENT, 53 Grove Avenue, Chilwell, Notts.

NORTHERN IRELAND

Chairman W. GRAHAM Vice-chairman W. J. WATTS

Committee

F. G. Anderson	W. J. Macnab	R. J. G. Reid	H. Wood
W. H. King	P. Pyle	F. Sloan	

Honorary Treasurer N. HINDSHAW, 9 Kings Park, Knock, Belfast

Honorary Secretary J. PORTER, 22 Rosemary Park, Malone, Belfast

SCOTTISH

Chairman J. G. B. MCCALLUM Vice-chairman I. GAILEY

Committee

R. G. Caldow	C. H. Giles	D. B. F. McAndrew	P. Schwarzenbach
I. F. Y. Dick	W. G. B. Grant	R. McDonald	J. A. Young
A. R. Edge	J. H. Jackson	B. W. Mills	

Honorary Treasurer H. R. CRONE, 26 Atholl Drive, Giffnock, Renfrewshire

Honorary Secretary F. ATTACK, 6 Banavie Road, Glasgow W.1

WEST OF ENGLAND AND SOUTH WALES

Chairman G. WELFORD Vice-chairman DICK CARTER

Committee

R. Beaumont	F. Jamieson	M. Magnew	T. Smith
J. F. D. Butterworth	A. S. Levesley	S. Shaw	J. W. Young

Honorary Treasurer E. HOLDEN, Cabot House, Clifton Down Road, Bristol 8

Honorary Secretary J. N. LITTLER, c/o I.C.I. Ltd., Trafalgar, The Promenade, Clifton, Bristol 8

WEST RIDING

Chairman J. RANKIN Vice-chairman S. R. COCKETT

Committee

*J. Budding	R. K. Fourness	R. Heaton	E. Rowling
C. O. Clark	J. Furniss	K. A. Hilton	G. E. Styan
*Kathleen Cope (Mrs.)	J. M. Goodall	J. G. Hopkinson	
F. F. Elsworth	C. W. Green	L. Peters	

(* ex officio member)

Honorary Secretary ESMÉE SMITH (Miss), Flat 16, Foxhill, Weetwood Lane, Leeds 16

BRADFORD JUNIOR BRANCH

Chairman R. S. HARDING Vice-chairman E. N. WOOD

Committee

B. Bennett	M. Dunsmore	E. Eastham	H. Jaffri
------------	-------------	------------	-----------

Honorary Secretary KATHLEEN COPE (Mrs.), 232 Wyke Lane, Wyke, Bradford, Yorkshire

Assistant Honorary Secretary W. R. HERMES, 69 Manston Way, Crossgates, Leeds 15

LEEDS JUNIOR BRANCH

Chairman B. C. BURDETT Vice-chairman D. BALMFORTH

Committee

J. R. Aspland	C. North	P. J. Smith	J. Wyles
D. Batly			

Honorary Secretary J. BUDDING

Department of Colour Chemistry and Dyeing, The University, Leeds 2

MANCHESTER JUNIOR BRANCH

Chairman A. S. FERN Vice-chairman H. A. TURNER

Committee

R. D. Ellor	A. P. Lockett	T. A. Nutton
-------------	---------------	--------------

Honorary Secretary W. R. LEIGH, 1 Grange Road, Bromley Cross, Bolton, Lancs.

SCOTTISH JUNIOR BRANCH

Chairman C. MCNEIL Vice-chairman W. A. BLUE

Committee

*F. Attack	I. Fleming	D. S. Hay	G. H. Mattinson
*H. R. Crone	*I. Gailey	*J. G. B. McCallum	

(* ex officio member)

Honorary Secretary R. McDONALD, 5 Orchard Street, Paisley, Scotland

AFFILIATED SOCIETIES

THE SOCIETY OF DYERS AND COLOURISTS OF AUSTRALIA

<i>President</i>	E. I. Noble
<i>Immediate Past President</i>	W. H. Wainwright
<i>Honorary General Treasurer</i>	W. C. Castle
<i>Honorary General Secretary</i>	J. Brear c/o ICIANZ Ltd. 529 Lonsdale Street Melbourne
<i>Publications Editor</i>	R. S. Mayston

Section Committees

VICTORIAN

<i>Chairman</i>	R. Brereton
<i>Vice-chairman</i>	B. Knight
<i>Honorary Secretary</i>	P. Law
<i>Assistant Honorary Secretary</i>	L. Crawshaw
<i>Honorary Treasurer</i>	B. Firth
<i>Counsellor</i>	W. J. Waldie
<i>Librarian</i>	R. Mayston
<i>Auditor</i>	E. P. Woodall
<i>Committee</i>	T. H. Hall, B. Hardy, J. Harkinson, A. Morrison, and A. Munro

GEE LONG (SUBSECTION)

<i>Chairman</i>	A. Gayson
<i>Honorary Secretary</i>	E. Foster
<i>Honorary Treasurer</i>	Miss L. Hill

SOUTH AUSTRALIAN

<i>Chairman</i>	E. Voitekuns
<i>Vice-chairman</i>	S. G. Pike
<i>Honorary Secretary</i>	R. P. Cook
<i>Assistant Honorary Secretary</i>	S. G. Pike
<i>Honorary Treasurer</i>	J. Allen
<i>Honorary Librarian</i>	H. D. Bruce
<i>Committee</i>	W. Binder, I. Emslie, B. Forsyth, N. Seager, W. H. Wainwright, L. Way, and G. Wood

NEW SOUTH WALES

<i>Chairman</i>	H. W. Senior
<i>Vice-chairman</i>	W. Rogers
<i>Honorary Secretary</i>	A. McLean
<i>Honorary Treasurer</i>	F. Powell

QUEENSLAND

<i>Chairman</i>	J. Lee
<i>Vice-chairman</i>	M. G. Tune
<i>Honorary Secretary</i>	J. Ogilvie
<i>Assistant Honorary Secretary</i>	K. Chambers
<i>Honorary Treasurer</i>	I. Curtis
<i>Honorary Librarian</i>	H. Waldon

WEST AUSTRALIAN

<i>Chairman</i>	J. Smith
<i>Vice-chairman</i>	W. Donovan
<i>Honorary Secretary and Treasurer</i>	C. W. Cruickshank

NEW ZEALAND

<i>Chairman</i>	C. J. Ward
<i>Vice-chairman</i>	J. Tattersfield
<i>Honorary Secretary/Treasurer</i>	A. C. Miller
<i>Assistant Honorary Secretary</i>	F. T. Schafer

DYERS AND COLOURISTS ASSOCIATION OF SOUTH AFRICA

P.O. Box 1700, Durban

<i>Chairman</i>	J. H. Allen
<i>Vice-chairman</i>	E. Hipperson
<i>Committee</i>	E. Cornah and B. Farmer
<i>Treasurer</i>	E. Cullis
<i>Secretary</i>	G. H. Hayward

Proceedings of the Society

Annual General Meeting

The Seventy-fifth Annual General Meeting of the Society of Dyers and Colourists was held at the Grand Hotel, Leicester, on Friday, 10th April 1959, at 3.45 p.m., the President (Mr. JOHN BOULTON) being in the chair, and about seventy members of the Society being present.

The President extended a welcome to all present.

1. NOTICE CONVENING THE MEETING

The General Secretary read the Notice convening the Seventy-fifth Annual General Meeting of members of the Society as follows—

The Seventy-fifth Annual General Meeting will be held on Friday, 10th April 1959, at 3.45 p.m., at the Grand Hotel, Leicester.

L. MORTON WOOD
(Honorary Secretary)
13th March 1959

2. MINUTES OF THE SEVENTY-FOURTH ANNUAL GENERAL MEETING HELD ON 25TH APRIL 1958

The Chairman stated that the Minutes of the Seventy-fourth Annual General Meeting of members of the Society had been circulated and no written corrections had been received. He therefore submitted these Minutes to the Meeting.

Mr. A. S. CLULEY proposed, Miss E. SMITH seconded, and it was unanimously—

Resolved that the Minutes of the Seventy-fourth Annual General Meeting of Members of the Society of Dyers and Colourists held on 25th April 1958, at the Central Hotel, Glasgow, be adopted.

3. ANNUAL REPORT OF THE COUNCIL OF THE SOCIETY

The past year has been one of the busiest in recent decades of the Society's history.

Heading the list of the Society's achievements during the period under review is the completion of the *Colour Index* (Second Edition), the production of which was started at the first meeting of the Society's *Colour Index* Editorial Panel on 5th October 1945 in Manchester and completed by their 168th final meeting on 20th August 1958 held at Torridon, Leeds. The Society has completed delivery to all subscribers.

The First Edition of the *Colour Index* was published in 1924 in one volume, and the Second Edition, with four volumes, contains 3,595 disclosed constitutions and no less than 31,500 commercial names.

Nine Presidents of the Society have served during the production of the *Colour Index* (Second Edition).

The Society makes its impact as a result of voluntary services, of which the *Colour Index* is an outstanding example, and it is not remotely possible to calculate the man-hours that have gone into this great work of scientific records of techniques and advance in the world of colour.

The Council, at a private complimentary Celebration Dinner, paid tribute to "those who have contributed to the work" and extended thanks to all concerned in the production of the new *Colour Index* and to firms who have so generously permitted their staffs to devote their time in honorary service to the Society. Council further decided that awards should be granted in recognition of outstanding honorary services rendered, and presentations were made at the Celebration Dinner held on Monday, 15th December 1958, in accordance with the recommendations of the Society's Medals Committee.

The Society maintains friendly co-operation with the American and European kindred bodies, and closer working arrangements have been agreed upon between the Australian Society and ourselves, whereby the former becomes a section of the Society of Dyers and Colourists, and similar arrangements with New Zealand and with South Africa are progressing favourably.

The expansion of the Society's interests continues, and the Council has agreed to the formation of a South West of England Section based on Bristol. Correspondents are being appointed in several of the outlying districts who will be the responsible local contacts. Enquiries are proceeding with a view to consideration being given to the formation of a section in South Wales.

The Council welcomed the announcement of the Authorities' Panel of the Burnham Committees that the Society's application had been considered and the Associateship by examination had been accepted as a degree equivalent for the purposes of the Burnham Main and Technical Reports.

Members will welcome the approval by the Commissioners of Inland Revenue whereby, under Section 16 of the Finance Act 1958, subscriptions to the Society may be allowable for Income Tax purposes.

The Council has set up an International Relations Committee with academic, scientific, and technological representations and with heads of industry, to study and to promote the Society's interests by such means as—

- (i) Promotion of formal liaison with organisations similar to our own in other countries
- (ii) Assistance to overseas members in providing, where numbers warrant it, corporate membership as affiliated bodies or as Overseas Sections of the Society
- (iii) Furtherance of co-operation with other overseas organisations in holding the Society's Associateship examinations
- (iv) Strengthening of the bonds with sister societies by identifying them more closely with the proceedings and workings of the Society.

The registration forms and all documents in connection with the Fifth Congress of the International Federation of Associations of Textile Chemists and Colourists, which is to be held in London on 16th–18th September 1959, have now been circulated, and bulk supplies have been sent to each member association of the Federation.

The Council congratulates Mr. John Boulton, President, on his election to the Presidency of the International Federation of Associations of Textile Chemists and Colourists. This honour was conferred upon Mr. Boulton at the meeting of the Council of Delegates held in Milan in December 1958.

Congratulations are extended to Mr. John Barritt and Dr. W. R. Moore on their appointments as Officer and Member respectively of the Order of the British Empire, announced in the 1959 New Year Honours. Mr. Barritt has given valued services to the Society as a former Honorary Secretary, as Chairman of the Publications Committee, and as Chairman of the *Colour Index* Editorial Panel. Dr. Moore's services to the Society are also highly valued, and at the Summer School held in Nottingham he was untiring in his efforts to help make it a success.

Council is pleased to award Honorary Membership of the Society, the highest honour it is empowered and privileged to bestow, to Harold Henry Bowen, in recognition of fifty years distinguished and devoted service to the Society and to the industry.

Council is also pleased to award Honorary Membership of the Society to William Hamlin Cady who has been a member of the Society for fifty years. He is a founder member and a Past-President of the American Association of Textile Chemists and Colorists and has actively contributed to the work of the *Colour Index*. Arrangements are being made for presentation to take place in America of the Society's illuminated address at a function of the American Association.

Council congratulates John Willie Hirst of Melbourne, Australia, on completion of fifty years membership of the Society.

The Society held the 1958 Annual General Meeting and Annual Dinner at the Central Hotel, Glasgow, on Friday, 25th April 1958, which was the Golden Jubilee of the Scottish Section. The Dinner was held in the banqueting hall, which was decorated with lighted cascades of colour, tartan displays, and shields, and guests were piped in with traditional ceremony. The Rt. Hon. The Lord Provost of Glasgow, Mr. Andrew Hood, described the gathering as the largest he had seen in that hall.

The Council records thanks to all concerned with the Society's Summer School on *Dyeing* and congratulates them on the excellent result of their efforts.

The Fifth George Douglas Lecture was given at the Midland Hotel, Bradford, on Wednesday, 5th November 1958, by Dr. Walter Gutmann, on *Textile Finishing—Problems of Today and Tomorrow*. The generosity of the Bradford Dyers'

Association Limited, which made possible these Lectures, is very much appreciated by Council.

Council acknowledges with thanks donations to the Society and the gift of thirty guineas from the Dyers' and Finishers' Association to be used for prizes to be competed for by Junior Members of the West Riding Section of the Society.

The Council records thanks to firms, colleges, and technical institutions for their help in allowing members of their staffs to devote time to the Society, and in particular extends thanks to authors of papers and communications, referees, and all who contribute honorary services to the Society and to the *Journal*.

The Sixth Annual Golf Competition was held at Leek on 18th May 1958, when there were 28 entrants. Once again Council thanks Mr. W. R. Leigh for organising this very successful competition and social event.

Reports on Activities of Committees

FINANCE AND GENERAL PURPOSES COMMITTEE—This Committee has presented to the Council the Annual Accounts in similar form to that used last year, and although a deficit is disclosed it has been a very successful year in service to the members of the Society.

The position of the Society is being kept under constant review by the Committee and their advisers, and steps to maintain the finances on a satisfactory long-term basis are being considered.

A room at the present offices of the Society has been converted and furnished as a Library and Meetings Room, and members are invited to make use of this accommodation.

SOCIETY'S MEDALS COMMITTEE—The following recommendations of the Committee for awards in recognition of work done for the *Colour Index* were accepted by Council—

Gold Medals John Barritt (presented in 1958)

Harold Blackshaw	William Bradley
James G. Grundy	Ramsay J. Hannay
Morvan Lapworth	Alex Thomson

Bars to Gold Medals

Harold H. Bowen	Cyril O. Clark
Herbert H. Hodgson	

Inscribed Presentation Sets of the Colour Index to the above and also to—

Douglas A. Clibbens	Alfred W. Doyle
Frank S. H. Head	John S. Heaton

Shields of the Society's Coat of Arms

Brojendra C. Bhattacharya	Edwin J. Cross
Frank F. Elsworth	William E. Wood
Tadeusz Z. Wozniczka	

and

The President of the Oil and Colour Chemists' Association.

Diploma of Thanks to firms and all who have individually or collectively contributed to the production of the *Colour Index*.

Posthumous Award—A suitable recognition to the widow of the late Arnold Shepherdson.

The above awards, approved by Council, were presented at the *Colour Index* Celebration Dinner held on 15th December 1958.

Further recommendations accepted by Council, for awards for services to the Society, are as follows—

Gold Medal	Thomas Vickerstaff
Silver Medal	Reginald Langham Elliott
Bars to Silver Medals	Alfred William Carpenter and Horace Turner
Bronze Medals	Joan Margaret Firth James Kenneth Skelly Kenneth Meldrum Harry Walker Taylor

These medals will be presented at the Society's Annual Dinner at Leicester on 10th April 1959.

WORSHIPFUL COMPANY OF DYERS RESEARCH MEDAL COMMITTEE—The Council has recommended, in accordance with the decision of the Society's Adjudication Committee, that the Research Medal be awarded to Alan Johnson, M.Sc.Tech., Ph.D., for a series of papers on *The Chemistry of Esters of Leuco Vat Dyes*. The recommendation has been approved by the Court of the Worshipful Company of Dyers.

DIPLOMAS COMMITTEE—The Committee has held three meetings during the year, and as a result of the examinations fifteen recommendations for the award of the Associateship were made to Council. In addition, nine recommendations were made to Council for conferment of Fellowships. All these recommendations were accepted.

PUBLICATIONS COMMITTEE—During the year the Publications Committee has maintained the high standard of papers and communications in the *Journal*. The Notes Section has been expanded, and a new Section, *Colour Index* Additions and Amendments, introduced.

Considerable changes have been made in the Standing Matter and more are contemplated in 1959, which year sees the 75th Anniversary of the publication of the *Journal*. It is hoped to mark the occasion by the issue of a cumulative index of papers published over this period.

The Committee would like to record thanks to all who have contributed to this highly successful team-work throughout the year.

The **TEXTBOOKS AND MONOGRAPHS SUB-COMMITTEE** has supervised the publication of the monograph by Dr. A. Dwyer on *The Dyeing and Finishing of Half Hose and other Footwear*.

PRESERVATION OF HISTORICAL RECORDS COMMITTEE—A catalogue of the Society's collection of Records is nearly completed, and consideration is being given to providing suitable accommodation for the collection.

Colour Index EDITORIAL BOARD—This Board has replaced the Editorial Panel. It has met twice since its inauguration, and its immediate task is to deal with information which has accumulated since the Second Edition of the *Colour Index* was

published. This information is to be used for the proposed Supplement, and former contributors are invited to co-operate.

FASTNESS TESTS CO-ORDINATING COMMITTEE—The year's activities have been mainly concerned with arrangements for the biennial meeting of the ISO Colour Fastness Subcommittee (ISO/TC. 38/SC.1), which was held in Lucerne in September. A full account of this meeting appeared in the *Journal* in November (p. 769). Four members of the Committee and one member of the Pleating Fastness Subcommittee represented the United Kingdom at this meeting and between them provided the Chairman of the Conference and the Chairmen of two Working Groups.

ISO was founded in 1947, and now, eleven years later, it is beginning to show results in the colour fastness field. Although none of the tests on which international agreement has been reached has yet proceeded to the final stage (as an ISO Recommendation) national standards organisations are beginning to publish them as national standards.

The Pleating Fastness Subcommittee has been very active and has published a detailed paper in the January 1959 *Journal*. The recommendations made have been accepted as part of an ISO Tentative Test.

The only other technical item of note was the publication of a test for fastness to daylight at high humidities; comments on the usefulness of this test have been invited.

Three papers were published in 1958 under the Sponsored Publications scheme, and a translation into German of a review of light fastness testing by the Chairman of the Light Fastness Subcommittee was published in *Textil-Rundschau*.

Dr. P. W. Cunliffe, Chairman of the Committee since its re-formation in 1950, resigned as Chairman at the end of the year, his place being taken by Mr. K. McLaren, Honorary Secretary to the Committee since 1951; the latter office has not yet been filled.

In 1959 it is intended to bring up to date the *Standard Methods*, whilst the subcommittees will be mainly concerned with the new proposals emanating from the ISO meeting.

The Fastness Tests Co-ordinating Committee records through Council its appreciation and thanks for the helpful work contributed by the following subcommittees—

Light Fastness
Gas Fume Fading
Pleating
Alkaline Milling
Perspiration

TERMS AND DEFINITIONS COMMITTEE—Close on 120 recommended definitions were published in the January 1958 issue of the *Journal*. Although written comments and criticisms were invited, none have been received, other than from members of the Committee itself, and it is believed that these definitions have met with general approval. The Committee has discussed definitions of some twenty additional terms, and has co-operated with the Textile Institute Terms and Definitions

Committee on which the Society is represented. It has invited requests for definitions of terms which may give rise to special difficulty in the colour-making and colour-using industries.

REVIEW OF TEXTILE PROGRESS—The Committee met on four occasions and, apart from its normal business of considering the authors, group editors and materials for the current and subsequent Annual Reviews, the Committee has given particular attention to some proposals for altering the format and approach of the Review, designed to take effect at Volume XI. They are also considering the value of a decennial review for certain subjects and the response there might be to the publication of a decennial index.

Activities of Sections

Mention is made of the following activities of Sections, which are in addition to the much appreciated lectures and social events arranged during the year.

HUDDERSFIELD—The establishment of an independent Membership Register is an encouragement to the Section. A visit to the Atomic Energy Station at Calder Hall, Cumberland, was of great interest and an outstanding success.

LONDON—The year has been marked by the investiture of the Chairman's Badge of Office, which was purchased by the members of the Section. The Annual London Lecture continues to attract a wide interest and this year *Colour in Art* was the subject of A. Lucas Esq., the Chief Restorer to the National Gallery.

MANCHESTER—The Section Committee organised the well attended Peter Griess Centenary One-day Symposium, held in Manchester in honour of the discoverer of the diazo reaction.

MIDLANDS—A well attended and very successful Summer School on *Dyeing*, which was held at the University of Nottingham in August, entailed much hard work by the Midlands Section Committee.

NORTHERN IRELAND—The Section Committee, in considering expansion of its activities, has been assisted by lectures being arranged in Dublin and Cork. These were a source of satisfaction to members and potential members.

SCOTTISH—The Society enjoyed the hospitality of the Scottish Section when the Annual General Meeting and Annual Dinner were held at the Central Hotel, Glasgow. The occasion, which was very successful, stimulated local interest in the activities of the Society and the Section.

WEST RIDING—The Section Committee organised a One-day Conference on the Dyeing and Finishing of Blends of Wool with Polyester and Acrylic Fibres and their Fastness Properties.

An outstanding event was the successful Bradford Junior Branch Diamond Jubilee Celebration Dinner and Dance.

The Bradford, Leeds, Manchester, and Scottish Junior Branches continue to be active.

The Society's representatives on the following External Bodies continue to be active.

Bradford Institute of Technology—Governing Body

British Biological Stains Commission

British Standards Institution—

Cotton Industry Committee

Colouring Matters for Use in Foodstuffs

Colour Terminology

Electric Discharge Lamps

Linen Industry Committee

Letterpress Inks

Methods of Test for Surface Active Agents

Proofed Clothing—Dyeing and Finishing Processes Committee

Pyridine

Rayon Industry Committee

Rotproofing of Textiles other than Clothing

Silk Industry Committee

Steering Committee T/-/8

Subcommittee and Panel on Standards for Anodic Oxidation Finishes for Aluminium and Aluminium Alloys

Textile Divisional Council

Universal Decimal Classification Committee—Textiles Panel

Wash Fastness of Buttons

Wool Industry Committee

Chemical Society Library Committee

City and Guilds of London Institute—Dyeing Advisory Committee

Faraday Memorial Committee

Manchester College of Science and Technology—Court of Governors

National Illumination Committee of Great Britain and the Subcommittee on Colorimetry and Colour Rendering

Parliamentary and Scientific Committee

Regional Advisory Council for Technical and Other Forms of Further Education for Manchester and District—

Post Advanced Textiles Advisory Committee

Post Advanced Chemistry Advisory Committee

Royal Society—National Committee for Chemistry

Royal Technical College, Salford—Applied Sciences Advisory Committee

Society of Leather Trades Chemists—Committee for Fastness Properties of Dyes on Leather

Textile Institute—

Technical Committee "D"

Textile Terms and Definitions Committee

Unification of Testing Methods Committee

Yorkshire Council for Further Education—

County Advisory Committee for Chemistry

County Advisory Committee for Textiles.

* * *

The Honorary Secretary, Mr. L. MORTON WOOD, in submitting the Annual Report of the Council of the Society, which had been circulated, expressed his pleasure at once again presenting the Annual Report for adoption. Mr. Wood hoped that this would be of considerable interest to members. He regretted that there had been omitted from the

recorded thanks of the Fastness Tests Co-ordinating Committee the Washing Fastness Subcommittee, and he now formally recorded the thanks of Council to this Subcommittee.

Mr. Wood referred to the scope of the Society being extremely wide, which in itself showed that it was going from strength to strength, and this, he appreciatively recorded, was helped by the tremendous amount of voluntary effort given on all sides. He recalled that he had emphasised this last year, and the upsurge in this respect was worthy of this further mention.

Mr. Wood referred to the new and very important International Relations Committee, which, it was hoped, would make the Society even better known than it was at present and would plan for a closer relationship with overseas subscribers, to ensure an ever improving service being rendered by the Society throughout the world.

The Honorary Secretary considered it his duty to draw attention to the London Congress of the International Federation of Associations of Textile Chemists and Colourists to be held in London in September 1959. He spoke of how proud we were, having only recently joined the Federation, to be asked to be the host Society for this first visit to England of the Federation. He appealed to firms to facilitate the attendance of their staffs and to the directors and executives to bring their friends along, and he pointed out that the Congress was unlikely to come to England again for ten years at least.

The Society had, in Mr. Wood's opinion, reached the crossroads in progress, and the Council would need to decide whether the Society was going forward or whether it was going to hold back, operating only in a provincial or localised capacity. If it held back it would be a failure, and nothing it had undertaken up to the present had failed, but all the new committees, the Congress, and other steps which were widening the interests of the Society cost time, effort, and money. Also, there was the increasing work put upon the administration, which some members might regard as top-heavy, but, pointed out Mr. Wood, the more work undertaken by the Society the more was increased assistance required to ensure efficiency in service to over 4,500 members and subscribers, which number was growing with the expansion of the Society. He welcomed the Australian Society as a Section of the Society, and spoke hopefully of negotiations in progress for a similar status in South Africa.

The Society's *Journal* was held to be a premier publication of its kind, and Mr. Wood felt that all concerned should be striving to maintain the standard of this work. On behalf of the Publications Committee he appealed for more technical papers to be forthcoming.

In conclusion, Mr. Morton Wood expressed thanks and paid tribute to the General Secretary, Mr. John Nicholls, and to Dr. C. J. W. Hooper, the Editor of the Society's *Journal*, for the prodigious work done throughout the year and for the loyal and enthusiastic way in which they had been assisted by the staff.

The Honorary Secretary then formally proposed the adoption of the Annual Report of Council, which was seconded by the Chairman of the Publications Committee, Mr. A. THOMSON, and was declared carried *nem. con.*

4. PRESENTATION OF BALANCE SHEET

The Honorary Treasurer, Mr. A. WADDINGTON, in presenting to the meeting the Annual Accounts of the Society for the year ended 31st December 1958, said that he did not propose to deal with these in detail, as they had already been carefully scrutinised by the Council and its Finance and General Purposes Committee, but he would like to refer to several salient matters of interest.

The Society's investments were almost identical with those of the previous year, and it was pleasing to note that they were increasing a little in value.

With regard to the *Colour Index*, all the Society had to do now was to sell the rapidly decreasing stock of sets of four volumes each, and he thought that the Society's remaining 500 sets would soon go and there would be no reprint, although the ultimate possession of a supplement would be useless without the original set.

Just over £6,000 had been received by the Society from the American Association of Textile Chemists and Colorists, and it was anticipated that by the end of 1959 the balance owing from America would be either liquidated or negligible.

The *Colour Index* Editorial Board, as it was now called, was keeping the *Index* up to date by issuing quarterly *Additions and Amendments*, which was added work on the already heavy burden of the administration.

Referring to the Revenue Account, the Honorary Treasurer pointed out that almost every item of income had increased, but unfortunately expenditure had also increased along with the expansion of the Society's interests, which was basically the reason for the loss recorded on the year's working for 1958.

However, he did not feel that this gave a fair picture of the Society's activities for the year, and he therefore wished to mention as an example two items which had considerably increased. The Sectional costs since 1955 had increased from £800 to £1,500, which amounted to approx. 15s. 0d. per member in the British Isles. The postage on the Society's *Journal* amounted to something in the region of 7s. 0d. per member. These two items alone accounted for more than one-third of the annual income from subscriptions.

Mr. Waddington referred to the two previous Annual General Meetings, when he had warningly drawn attention to increasing costs, which were only in keeping with the times, and without increasing revenue to meet the situation there must inevitably be a closing balance showing a loss, and this was what had happened.

The Council and its Finance and General Purposes Committee were fully aware of all contributing circumstances and had under consideration proposals to remedy the position in due course. There was also reason for confidence in that the Society was a very lively flourishing concern with

Consolidated General Revenue Account

for the Year ending 31 December 1958

31.12.57	EXPENDITURE	£	31.12.57	INCOME	£
9,184	Salaries, Wages, National Insurance and Honoraria	10,116	7,961	Membership Subscriptions Journal	8,173
595	Rent, Rates and Insurance	835		Income from Journals, Reprints, Combined Reports, Advertisements etc., as adjusted for Opening and Closing Stock	17,361
148	Electricity and Heating	181	16,853	Investment Income (Gross)	703
391	Telephone	358	683	Interest on Bank Deposit Account	7
1,326	Printing and Stationery	1,575	433	Balance of Account "Fastness Tests"	1,800
474	Postages	576	160	Donations	150
	Hire of Rooms for Council, Committees, Sections and Conferences, etc.	222	349	Buxton Symposium	-
132	Travelling and Hotel Charges	273	27,322	Transfer of Expenditure relating to Colour Index	9,297
504	National Deferment Expenses	-	-	Net Deficit for the Year	587
177	Incidental Office Costs	186			
	Depreciation of Office Furniture and Equipment	354			
150	Bank Charges	76			
83	Audit	320			
180	Repairs and Renewals	116			
217	Medals, Prizes and Illuminated Address	165			
39	Donations and Subscriptions	83			
48	Diploma Costs (Less Fees)	113			
91	Sectional Costs	1,547			
1,288	Printing and Publishing Journal and other Publications	15,577			
13,245	Publications Committee Expenses	104			
79	Abstractors' Fees and Book Reviews	679			
346	Printing and Publishing Colour Index	38			
20,307	Colour Index—Administration, Advertising Shipments and Dispatch, Additions and Amendments	3,841			
2 836	Expenses incurred for Colour Index but not allowable per Agreement with A.A.T.C.C.	47			
155	Colour Index Celebration Dinner	293			
351	Annual Meeting and Dinner	73			
---	Summer School	155			
138	International Federation Subscription	116			
---	Peter Griess Symposium	49			
884	Net Surplus for the Twelve Months	-			
<u>151,769</u>		<u>£50,068</u>	<u>151,769</u>		<u>£50,068</u>

COLOUR INDEX

COLOUR INDEX (SECOND EDITION) ACCUMULATIONS ACCOUNT

	£		£
34 136	Accumulated Total of Expenditure to 1.1.58	61,458	Accumulated Total of Expenditure to 31.12.58
27,322	Expenditure during the year	9,297	70,755
<u>161,458</u>		<u>£70,755</u>	<u>£70,755</u>

GEORGE DOUGLAS ACCUMULATION FUND ACCOUNT

31.12.57	£	31.12.57	£
105 Lecture Expenses	105	Balance per Accumulated Income Account	276
2 Bank Charges	—	1.1.58	
Balance per Accumulated Income Account	230	Investment Income (Gross)	59
31.12.58	230	3% British Transport Stock 1979/89	59
276	230		
£383	£385	£383	£385

GEORGE DOUGLAS LECTURE FUND

	Balance 1957	Alterations	Balance 1958	Middle Market Value 1957	Middle Market Value 1958	Middle Market Quotation
British Transport Stock	£2,000		£2,000	£1,208	£1,314	66½

KNECHT MEMORIAL FUND

Southern Rhodesia	£100	£100	£69	£78	73½
-------------------	------	------	-----	-----	-----

SCHEDULE OF FOUNDATION FUND ACCOUNT INVESTMENTS

	£	£	£	£	
National Savings Certificates 10s. Units 8th Issue	500	500	500	500	—
3% Savings Bonds 1960/70	70	70	32	55	80½
Treasury 3½% Stock 1970/81	36	36	27	29	74
3% British Electricity Guaranteed Stock 1968/73	1,245	1,245	1,252	1,344	77½
	£1,851	£1,851	£1,851	£1,928	

SCHEDULE OF DEVELOPMENT ACCOUNT INVESTMENTS

3% British Transport Guaranteed Stock 1978/83	2,599	2,599	1,682	1,831	66½
2½% Funding Stock 1956/61	750	750	680	721	96½
3½% Conversion Loan 1961 or after	657	557	344	362	66½
3% Savings Bonds 1960/70	2,750	2,750	2,674	2,224	80½
3% Funding Stock 1966/68	750	750	590	624	83½ XD
National Savings Certificates 15s. Units 7th Issue	375	375	375	375	—
3% British Gas Stock 1960/65	2,000	2,000	1,208	1,328	66½
3% Treasury Stock 1966 or after	1,957	1,957	1,100	1,168	57½
3% Southern Rhodesian 1971/73	911	911	625	661	73½
York County Savings Bank	4,448	4,581	4,448	4,581	—
		Interest credited during the year			
		£125			
		Defence Bonds Interest credited			
		during the year £5			
3% British Electricity Guaranteed Stock 1968/73	1,496	1,496	1,080	1,159	77½
Post Office Savings Bank	1,131	1,158	1,131	1,158	—
		Interest credited during the year			
		£27			
Chesterfield Corporation 3% Stock 1960	994	994	923	970	97
Treasury 3½% Stock 1970/81	1,007	1,007	741	802	77½
3½% Defence Bonds	220	220	220	220	—
	£21,945	£22,105	£17,220	£18,184	

good reserves, which remained untouched despite the tremendously heavy payments in the complete clearance of the *Colour Index* printing and publishing commitments.

The Honorary Treasurer then formally moved the adoption of the Balance Sheet and Accounts for the year ended 31st December 1958.

Mr. J. W. REIDY, Chairman of the Finance and General Purposes Committee, seconded the adoption, and the motion was declared carried.

The Honorary Treasurer, answering questions, referred to increases in National Health Insurance Stamps, postage charges, printing and stationery, and staff remuneration as being reasonably in keeping with current rates paid. He also explained that at one time the *Colour Index* had a separate account for the collection of prepayments, but obviously these were used up on production payments, and financial transactions therefore automatically reverted to recordings in the Society's normal accounts.

The Honorary Treasurer stated that the Council had not transferred £1,000 to the International Federation Account, but as it had been decided to keep all financial transactions quite separate from those of the Society, the Council had decided to transfer £1,000 to the London (1959) Congress Account only as a working fund. Income from registrations, etc. had started to come in, and was credited to that working account, but the Society had to pay for the Congress Rooms at Church House, Westminster, and make certain other payments in advance. In addition a fund had been generously subscribed to by a number of firms, from which any financial deficiencies of the Congress would be met, so that there was no reason to fear calls being made upon the Society's own funds.

Mr. H. A. TURNER, a Vice-president of the Society, contended that, as the Society's subscription was the lowest of any comparable society in the country, the members were not doing too badly in getting value for money.

Mr. CLIFFORD PAINE, Chairman of the International Federation London Congress Planning Committee, replying to a question on the anticipated number at the Congress, said that it was practically impossible to estimate attendance at a Congress of this kind, and one could only go by analogy with Federation Congresses in other centres, which had been on the Continent. However, he felt that the support from this country would be considerable, although that from overseas might be less. Mr. Paine felt that the financing of the social functions was on a satisfactory basis, and from what he had seen of the detailed programme the quality of the scientific and technical side of the Congress would be such as to attract a very large registration from this country. Mr. Paine went on to say that a movable Congress such as the one now to be held in London draws its major support from the host country, and therefore it behoves the Society to give it the support it deserved as a worthwhile technical Congress.

The President pointed out that the great interest attached to this London Congress would be the wide representation from the Continent, and

from his visits there he felt with confidence that there would be a good overseas attendance.

5. ELECTION OF PRESIDENT FOR THE FORTHCOMING YEAR

The Immediate Past President, Mr. CLIFFORD PAINE, said that the Society, in its seventy-fifth year of maturity, could scarcely look upon the selection of a President in a light-hearted way, as the Society's responsibilities had grown and would continue to grow. We were, however, in the very fortunate position of having a proven candidate available. Mr. John Boulton, whose first year's term of office as President terminated at this Annual General Meeting, had expressed his willingness to serve for a further period of office, and Mr. Paine felt that all the members of the Society, whether present at the meeting or not, would welcome the opportunity of re-electing him.

All who had come into contact with Mr. Boulton would agree that he had fulfilled his public and external obligations on behalf of the Society with distinction. He had stimulated the Council of the Society with wisdom, and Mr. Paine said that he had not the slightest hesitation in putting to this Annual General Meeting the proposition that Mr. Boulton be asked to be the President of the Society for the forthcoming year.

A Past President of the Society, Mr. H. H. BOWEN, said that he had the greatest possible pleasure in seconding this proposition, which on being put to the meeting was carried with acclamation.

The President, Mr. JOHN BOULTON, in conveying his thanks, said how greatly honoured he felt at being re-elected for a further year. He also expressed his personal thanks to the members and to the Council, Honorary Officers, the Society's Officials and Staff, and particularly to the Chairmen and members of Committees, who had worked throughout the year to promote the interests of the Society. He spoke feelingly of references which had been made to the Society's establishment and its cost, and said that his own impression and experience were that the Society was extremely well served by its officials and staff, but it was apparent to him that there were not enough of them in coping as they were doing with the increasing momentum of the Society's expansion of interests.

6. ELECTION OF THE PRESIDENT-ELECT

The President, introducing Mr. F. Malcolm Stevenson as the nominee of Council as President-elect, said that the job of being President of the Society could take up two years in addition to the actual period of office: the first year as President-elect, when he became an Officer of the Society, then as President, and finally as Immediate Past President. In this latter respect, Mr. Clifford Paine had been a great help to him in advising and preparing him for the job of President, and he hoped that the President-elect would come into the position knowing he would receive such help from the President and the officers as they could usefully give.

The President, in formally proposing Mr. F. M. Stevenson, Chairman and Managing Director of Stevensons (Dyers) Ltd., as the President-elect, said that Mr. Stevenson was an old friend of the Society. He had considerable knowledge as a working dyer, and those who had been to his Ambergate Works in Derbyshire would know that in Mr. Malcolm Stevenson we had a forward-looking person and a very enthusiastic one.

Mr. A. W. CARPENTER, the immediate past Chairman of the Midlands Section, expressed the very great pleasure it gave him to second this proposition. In the 75 years' life of the Society, he believed that on only one previous occasion had the Presidency gone outside the great textile area of the North and the Metropolis.

On the proposition being put to the meeting, it was carried with enthusiasm.

The President-elect, Mr. F. MALCOLM STEVENSON, said how greatly honoured he was at being elected the future President, and he expressed his thanks for the confidence and trust placed in him. It was just forty years since he had joined the Society, when Mr. C. F. Cross was the President, and he had had no idea at that time that one day he himself might be President. He had some eminent men to follow, and his task would not be an easy one, so he would require Mr. Boulton to keep his promise to act as his guide during the coming year. He would do his best to equip himself in readiness for the office of President.

7. ELECTION OF ONE VICE-PRESIDENT

The General Secretary gave the result of the ballot for one Vice-president, which was as follows—

Mr. John Barritt	423 votes
Mr. A. S. Fern	152 votes
Mr. W. A. Edwards	142 votes
Mr. H. Foster	58 votes

The President congratulated Mr. JOHN BARRITT on becoming a Vice-president of the Society, and repeated what he had said the previous year, that he regarded it as a healthy sign when office was sought by a number of people.

8. ELECTION OF FOUR ORDINARY MEMBERS OF COUNCIL

The General Secretary reported that 786 ballot papers had been received, four were spoilt, and fourteen ballot papers had been received unstamped. The numbers of votes recorded for each candidate were as follows—

Mr. C. L. Bird	619 votes
Mr. A. W. Carpenter	576 votes
Mr. J. G. Hopkinson	459 votes
Mr. J. W. Reidy	456 votes
Mr. Clifford Duckworth	352 votes
Mr. G. Whitehead	299 votes

The counting of the votes, by two members of the staff of the Auditors to the Society, had been supervised by Mr. R. Grice.

The President declared the following elections to Council—

Mr. C. L. Bird
Mr. A. W. Carpenter

Mr. J. G. Hopkinson

Mr. J. W. Reidy

and offered his congratulations to these newly elected Ordinary Members of Council. He hoped that the losers for the vacancies of a Vice-president and Ordinary Members of Council would not lose heart, but consent to allow their names to go forward on a future occasion.

9. VOTE OF THANKS TO SCRUTINEER

Miss E. SMITH proposed a vote of thanks to Mr. R. Grice, who had once again scrutineered the ballot. This was seconded by Dr. L. PETERS and carried with enthusiasm.

10. VOTE OF THANKS TO RETIRING VICE-PRESIDENT AND ORDINARY MEMBERS OF COUNCIL

Dr. T. VICKERSTAFF said that, as the Honorary Secretary had already commented, the Society was largely dependent upon the voluntary services of members for its functioning both in Committee and in Council. It was fortunate that, as the Society was so active, there was a keen desire to serve in spite of the personal inconvenience caused. Dr. Vickerstaff then proposed a hearty vote of thanks to Professor W. Bradley, the retiring Vice-president, and to the retiring Ordinary Members of Council, Messrs. C. O. Clark, R. K. Fourness, W. L. Langton, and C. A. Mills.

This was seconded by Mr. H. W. TAYLOR, who expressed the hope that we should soon see these gentlemen back on Council once again.

The vote of thanks was carried with acclamation.

11. ELECTION OF HONORARY TREASURER

The President said that it gave him great pleasure to propose from the Chair that Mr. A. Waddington be re-elected Honorary Treasurer.

Mr. A. Waddington was declared unanimously re-elected.

12. ELECTION OF HONORARY SECRETARY

The President, in proposing the re-election of Mr. L. Morton Wood as Honorary Secretary, said that no President could have had more help than he had had from these two honorary officers, and he expressed the hope that they would be able to serve the Society for many years.

Mr. L. Morton Wood was unanimously re-elected Honorary Secretary.

13. APPOINTMENT OF AUDITORS

Mr. A. WADDINGTON proposed that Messrs. Rawlinson, Greaves, & Mitchell, Chartered Accountants, be re-appointed Auditors to the Society for the year 1959. This was seconded by Mr. J. RAYMENT and carried.

14. VOTE OF THANKS TO THE CHAIRMAN

Mr. G. H. CARNALL said that he had been rewarded for undertaking the journey to Leicester by being asked to propose a vote of thanks to the Chairman for presiding over the meeting. He felt that all would agree that Mr. John Boulton had displayed the qualities they knew he possessed, and the absence of controversial discussion was rather

a tribute to the soundness of the Society than an indication of any tendency on the part of the Chairman to prevent discussion: in fact he was rather inclined to encourage it. Mr. Carnall then proposed a hearty vote of thanks to the Chairman, Mr. John Boulton, for the manner in which he had

presided over the proceedings that afternoon. This was carried with acclamation.

The President read messages of greeting from Mr. R. A. Peel and Mr. G. S. J. White, which were received with appreciation.

The meeting then terminated.

Annual Dinner

The Seventy-fifth Annual Dinner of the Society was held at the Grand Hotel, Leicester, on Friday evening, 10th April 1959, under the presidency of Mr. John Boulton.

The principal guest was Lieutenant-Colonel H. F. Holme (*Prime Warden of the Worshipful Company of Dyers*). Among other guests were Alderman F. J. Jackson (*Deputy Lord Mayor of Leicester*), Sir Ernest Goodale (*President of the Textile Institute and President of the British Colour Council*), Dr. D. W. Kent-Jones (*President of the Royal Institute of Chemistry*), Mr. R. E. Wood (*Principal of the Leicester College of Technology and Commerce*), Dr. J. W. Illingworth (*Director of Research of the Hosiery and Allied Trades Research Association*), Mr. J. C. MacCallum (*Director of Research of the Lace Research Association*), Mr. F. Waterfield (*President of the Midland Hosiery Dyers and Finishers Federation*), Mr. L. M. Wood (*President of the Dyers and Finishers Association and Honorary Secretary of the Society*), Mr. D. R. Balfour Park (*Clerk of the Worshipful Company of Dyers*), Mr. C. G. Hulse (*Board of Trade*), Mr. G. W. Bednall (*Editor of "The Dyer"*), Mr. G. H. Carnall, Mr. R. D. Chorley, Mr. A. D. Ferns, Mr. J. Horsfield, Mr. E. Isles, Mr. H. R. Mathys, Mr. G. L. Thornton, Mr. H. Wiles; Mr. F. M. Stevenson (*President-elect*), Mr. Clifford Paine (*Immediate Past President*), Mr. H. H. Bowen (*awarded (1959) Honorary Membership of the Society and Past President*), Dr. T. Vickerstaff (*awarded (1958) the Society's Gold Medal and Vice-president*), Dr. A. Johnson (*awarded (1958) the Worshipful Company of Dyers Research Medal and the Society's Diploma of Merit*), Mr. A. W. Carpenter (*awarded (1958) Bar to the Society's Silver Medal and Chairman of the Midlands Section*), Mr. H. Turner (*awarded (1958) Bar to the Society's Silver Medal*), Dr. R. L. Elliott (*awarded (1958) the Society's Silver Medal*), Mrs. J. M. Firth, Mr. K. Meldrum, Dr. J. K. Skelly, and Mr. H. W. Taylor (*awarded (1958) the Society's Bronze Medal*).

The following officers and other leading members of the Society also were present—Mr. Fred Smith and Dr. C. M. Whittaker (*Honorary Members and Past Presidents*); Mr. John Barritt (*Honorary Member and Vice-president*); Mr. R. J. Hannay, Mr. R. C. Oakley, Mr. W. Penn, and Mr. H. A. Turner (*Vice-presidents*); Mr. S. R. Cockett, Dr. G. T. Douglas, Mr. H. Hampson, Dr. L. Peters, Mr. J. W. Reidy, and Dr. A. E. Stubbs (*Ordinary Members of Council*); Mr. F. Attack, Mr. H. Boothroyd, Mr. W. Graham, Mr. R. Heaton, Mr. J. G. B. McCallum, Mr. J. Porter, Mr. J. Rayment, Mr. J. W. Reidy, and Miss Esmée Smith (*ex officio*

Members of Council); Mr. W. R. Leigh (*Junior Branch Officer*); Mr. A. Thomson (*Chairman of the Publications Committee*); Mr. J. V. Summersgill (*Honorary Secretary of the Publications Committee*); and Mr. A. Waddington (*Honorary Treasurer*).

The total number of diners was 433.

WELCOME TO LEICESTER

After the toast of "Her Majesty the Queen" the Society was welcomed to Leicester by—

Alderman F. J. JACKSON (*Deputy Lord Mayor of Leicester*), who expressed his pleasure in welcoming the Society to the City of Leicester. It was the largest gathering that he had attended in that room, and had even overflowed into another room. The Society's choice of venue was very appropriate, for the coloration and finishing of textiles formed a vital part of the industry of the city.

"THE SOCIETY OF DYERS AND COLOURISTS"

Lieutenant-Colonel H. F. HOLME, M.A., T.D. (*Prime Warden of the Worshipful Company of Dyers of London*) thanked the President and the Society for the great honour of being invited to be the principal guest. He was, naturally, extremely proud to be Prime Warden, as that position carried a long and honoured history in the affairs of our great capital city. To a certain extent he felt he was under false colours—if that was the *mot juste* in that gathering—in that, although he was Prime Warden of the Worshipful Company of Dyers, in his own profession he was not connected in any way with the craft of dyeing. He would console himself with the thought that he was *ex officio* an Honorary Member of the Society, and that was an honour he sincerely appreciated.

There are many links between his ancient Company and our modern and up-to-date Society, even though nowadays our outlooks are of necessity somewhat different. He could liken the Dyers Company to a middle-aged person who, although in his youth he had been a master of his craft, had not entirely kept up with the latest techniques, and as a result had broadened his outlook and turned more to giving a helping hand in a small way to those following on.

Your Society, on the other hand, is like the young man—a mere 75 years as opposed to at least 800 years of age—who is not only keeping up with these latest techniques, but is actually inventing and developing them in the forefront of what is a great and vital industry.

Many members of the Society here tonight are also liverymen of what is properly called *The Wardens and Commonalty of the Mystery of Dyers*

of the City of London. The word *mystery* is taken here to have two meanings—it may be thought of as referring not only to the fact that dyeing, like many another craft, had, and still has, its trade secrets, but more properly here, as the spelling suggests, it means *mastery*—to show that members of the livery had to be truly master-craftsmen.

It is of interest to note that twelve past presidents of the Society were liverymen of the Company. Several of them were also Prime Wardens and were, and still are, honoured and respected by the Company as well as by the Society. That makes you, Mr. President, the thirteenth. I hope you are not superstitious, but I know quite enough about you and your work to assure you that the Society has had the exact opposite of bad luck in having you as its President for these last two years, and the Company equally is proud and fortunate that you are on its livery. We are not only proud, but also delighted, that you have been elected this year President of the International Federation of Textile Chemists and Colourists, which is meeting in this country for the first time in September. The Court is looking forward to offering entertainment to some of the delegates during that period.

Several of your gold medallists have been liverymen: in fact two of them (Dr. C. M. Whittaker and Mr. Fred Smith) have been not only gold medallists but also past presidents, and in addition are with us here tonight.

A large proportion of winners of the Dyers Research Medal have been liverymen. I even see that the winner for 1943–1944 was a certain Mr. John Boulton. The granting of this medal always gives the Company very great pleasure every year, and I particularly hope that you here find it serves a good and useful purpose. I am very glad that the present recipient (Dr. A. Johnson) is here tonight, and am looking forward to presenting the medal to him at a dinner of the Court to be held next Wednesday evening.

I was interested to see on the Coat of Arms recently granted to the Society that you have several of the same symbols of the raw materials of dyeing as has the Dyers Company, notably the madder plant and the grain tree. I am given to understand that it used to be thought that it was the red berries of the grain tree or kermes that were made into a scarlet dye similar to cochineal. In fact the "berries" were not berries at all but small red insects which achieved the same purpose. Those of you who go out into your gardens when you get home tomorrow may perhaps see whether there is scope for some great invention in dyeing instead of ruthlessly spraying everything against greenfly and similar modern versions of the little red kermes insect. However, I fear that gardening and dyeing do not go together these days, at any rate in business hours. Nowadays it is all done by means of complex chemical formulae, and experiment in the laboratory, and later in the factory, as you, Mr. President, know very much better than I do. It is the results of these experiments, such as your most noteworthy publication of the *Colour Index*, which keep your great modern industry

always to the fore and ahead of your various competitors throughout the world.

As I said earlier, your Society is like the young man of genius who is forever thrusting forward successfully, and leading the way to great advances. Long may you continue to do so. I thank you for a most enjoyable and memorable evening.

Mr. JOHN BOULTON, M.Sc.Tech., F.R.I.C., F.T.I., F.S.D.C. (*President of the Society*), thanking the Prime Warden for the sincere and charming way in which he had proposed the health of the Society, said: We are intensely proud of the interest which the Worshipful Company takes in us and our work; a matter of particular pride is our custodianship of the Worshipful Company's Research Medal.

Colonel Holme has referred to the number of liverymen who have been Presidents of the Society. The fact that there have been no less than thirteen in the Society's history is evidence of a closer relation between the actual industry and the City Company than one would expect to find in most crafts. But that is only the external evidence of the mutual respect we hold for each other. As the thirteenth President from the Livery, I am very lucky in the kindness which the Dyers Company has shown me in other ways. Following the remarks of the Prime Warden I feel free to mention that, thanks to a most imaginative gesture offered in a most practical way, the Worshipful Company has enabled me, as President of the host Society, to show our distinguished overseas guests something of the life of a City Company. This will be an experience which could not be got anywhere else in the world, and the privilege of taking some of our overseas guests to Dyers Hall enhances greatly the attractions of the Congress.

This is mid-term for the President: a time for looking both behind and before at the affairs of the Society. The highlights of our year are dealt with in the report of Council, but I would comment on two of them: the successful launching of the completed *Colour Index*—2,500 sets of four volumes of this monumental work are already in circulation in over forty countries, and the Society is nearing the break-even stage, after which we shall see some material returns in addition to the prestige which this work has brought us. I must comment on the skill and patience that have gone into the preparation, financing, and distribution of this work, and reiterate my thanks to all concerned who have worked in honorary capacities.

In September this year we are to entertain the International Federation of Associations of Textile Chemists and Colourists in London for its triennial Congress. This will undoubtedly be the biggest and most representative gathering of textile chemists, dyers, and colourists to have been held in this country. The London Congress will mark our full establishment in the field of international relations. In the preparations for this Congress we have learnt a great deal which we did not know about our overseas counterparts. The text for the few remarks I intend to make tonight is to be found here.



THOMAS VICKERSTAFF
M.Sc., Ph.D., F.T.I., F.S.D.C.
Gold Medal for exceptional services to the Society
and for Research in the Tinctorial Arts



HAROLD HENRY BOWEN
F.S.D.C.
Honorary Membership in appreciation of fifty
years' devoted service to the Society and to
the Industry



ALAN JOHNSON
M.Sc.Tech., Ph.D.
Worshipful Company of Dyers' Research Medal for
1957-1958 as senior author of the series of papers on
The Chemistry of Esters of Leuco Vat Dyes
Diploma of Merit



HORACE TURNER

Bar to the Silver Medal for continued valuable services to the Society



ALFRED WILLIAM CARPENTER

Bar to the Silver Medal for continued valuable services to the Society



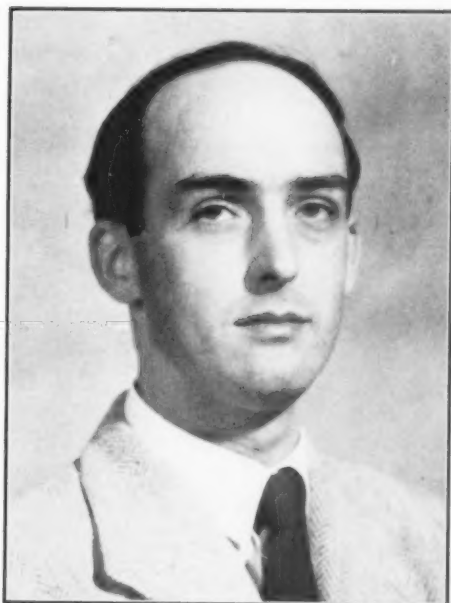
REGINALD LANGHAM ELLIOTT
Ph.D., F.R.I.C., F.T.I., F.S.D.C.

Silver Medal for valuable services to the Society



Mrs. JOAN MARGARET FIRTH
B.Sc.

Bronze Medal for valuable services to the Society



KENNETH MELDRUM
B.Sc., A.R.I.C.

Bronze Medal for valuable services to the Society



JAMES KENNETH SKELLY
M.Sc., Ph.D., A.R.I.C., F.S.D.C.

Bronze Medal for valuable services to the Society



HARRY WALKER TAYLOR
A.M.C.T.

Bronze Medal for valuable services to the Society



I have discovered, the more we have become involved in overseas work, ever increasing examples of the tremendous respect in which the Society is held by the rest of the world. And I have noticed the surprise of many of our own members in discovering this. Frankly, I wonder whether our recognised status at home matches the view which the Continental and American associations have of the Society, its work, and its potential influence. I think it does not, and I think it is largely our own fault.

The world is getting smaller; the Society is drawing correspondingly closer to its sister organisations all over the world and, with them, is certain in the future to become even more closely involved in the affairs of education and industry. To measure up to its international standing the Society will need soon to initiate a new era of self-expression and forward planning. We cannot forever go on appearing to function as a learned society cum publishing house cum examining body of a major technology with our present resources. Alongside an unprecedented and unmatched complement of honorary help and industrial goodwill on a national scale, these resources comprise a completely provincial organisation, a permanent staff led by two qualified people, and a rented office. The very pressures we ourselves have generated are fast pushing us out of this framework. Summer schools, symposia, publications, standing committees which deal with matters of national importance have developed from experiments to increasingly important institutions.

Membership at home is growing (total subscribers nearing 5,000). Membership abroad, already proportionately high, we have only just begun to tap; and my guess is that, following the London Congress and our further participation in the work of the International Federation, the flow of overseas members will increase.

Were I asked what the short-term objectives of Council should be, I would say: firstly the acquisition of a permanent home for the Society, appropriate to its standing. Secondly, full establishment of the Society's interests and influence in the training of textile chemists, in the newly established Colleges of Advanced Technology, and the full recognition of our Diplomas as an integral part of education schemes for our industry. Thirdly, our attaining a recognised status comparable with that of Chartered Societies attached to the chemical and physical sciences and the engineering technologies.

These concepts provide a field which is bound to sprout nettles, all of which will have to be grasped sooner or later. One which may come soon rather than late will be to increase the revenue which the Society gets from its members' subscriptions so as to compare more closely with the practice of other learned societies. Another problem for the future is the setting up of some form of office establishment, if necessary additional to our Northern headquarters, alongside the Society of Chemical Industry, the Royal Institute of Chemistry, and the Chemical Society in Metropolitan London. In the publication of the *Journal* over a period of 75

years, in our educational aims for textile chemists, in the production of the *Colour Index* we have been (and we must not be too modest to recognise this) the leading Society of the world. It has required the appreciation of our overseas colleagues to make most of us realise this. We must be sure that we are living up to our reputation and the responsibilities that go with it.

One could imagine from recent announcements in the national press concerning the health of some branches of the dyeing industry that these are parlous days in which to plan for the growth and the future of the Society of Dyers and Colourists. The contrary is the truth: what is clear is that in the immediate years ahead extensive reorganisation of the textile industry will mature. If in this process there has not been realistic recognition of the need for, firstly, greater technical efficiency and, secondly, a higher degree of scientific direction at the top allied to employment of trained technological staff throughout the whole industry, any reorganisation will be mere first-aid.

The future of our craft, as with other technologies on which standards of living in Western Europe depend, must be one of intensified technical development and new inventions. I spoke a year ago, and I have spoken since, of directions which such technical changes were likely to take. We can content ourselves now with the observation that in any trimming of production and rationalising of the industry, *more*, not *fewer*, highly trained people will be needed to run it: we will neglect to apply new inventions and the results of research at our immediate peril.

I am not giving a technical talk; I do not need to detail the continued contributions of the dye-makers and the fibre-makers to remind you that there is always a challenge ahead of us dyers. To mention only two matters: the prospect before us as it appeared, say, two years ago has been transformed considerably by the invention of chemically reactive dyes and by the swift extension of the synthetic fibre industry, including the domestic manufacture of acrylics on a potentially massive scale. To help the dyeing industry to keep abreast and to use fully every potential development such as these we shall need in the long term to be sure of two things—(i) a regular supply of highly trained and creative personnel, (ii) the capacity to solve quickly the problems posed by the availability of new materials, and the necessity to change quickly, when called for, the kind of work we do, in order to meet competition, especially in overseas markets.

Colleges of Advanced Technology, in addition to Manchester and Glasgow (where already degree standards obtain) number eight; and they have been financed and encouraged not only to produce a greater number of more completely trained technologists, but also to establish research schools. Almost all have Textile and/or Colour Chemistry Departments. Further, although the dyeing industry has no centralised research association, it can draw upon the resources of those devoted to textiles and other industries into which colour enters.

These two kinds of institution represent a future total training and research effort which on paper looks formidable. It is my personal belief, however, that university departments, colleges of advanced technology, and research associations will between them fail to provide the dyeing and finishing industry with the material for its technical progress unless they are able to maintain a close and living contact with industry and its practical problems, problems which change continuously in nature and priority.

In other countries it seems to me that an industry like ours has this close contact. I am thinking of organisations like the Massachusetts Institute of Technology and the Continental Technische Hochschulen. Here, one has professorial staff actually engaged in industry but available for the fertilisation of research and teaching. Also, especially in America, one has organisations sometimes attached to universities, in which projects sponsored directly by industry are undertaken.

These kinds of practice may not correspond with the English view of education, training, and research, but there is no doubt that they produce results in the field of technology. However we may press the practical needs of our industry by way of developments and inventions, I think we shall need to bring together in some way the national research potential in order to get practical answers within useful time. Research associations, university departments, colleges concerned with advanced technology, and representatives of the industry educated in its practical problems should, it seems to me, be enabled to work closely together in the interests both of training and of research.

If, as I believe, some integration of the national research effort becomes inevitable for our kind of industry, it will follow that this Society, the principal custodian of published work through its *Journal* and the *Colour Index*, guide and counsellor to the industry regarding the direction that new work is taking through its symposia and Schools, will have an increasingly important part to play. And here again I would say that everything that can possibly be done to help us to measure up to that will need to be actively considered, and very soon.

I should like to thank the Immediate Past President, Mr. Clifford Paine, for his great support during the year and especially for his drive and leadership in the London Congress Planning Committee. I must thank, too, the officers and the staff of the Society for bearing with me in the many activities we have undertaken, and finally, offer to Mr. Malcolm Stevenson as President-elect a warm welcome to our counsels.

HONORARY MEMBERSHIP

Mr. JOHN BOULTON (*President of the Society*) presented a Diploma of Honorary Membership of the Society to Mr. Harold Henry Bowen, awarded "in appreciation of his fifty years' devoted service to the Society and to the Industry".

PRESENTATION OF AWARDS

The President then made the following presentations—

<i>Gold Medal</i>	Dr. T. Vickerstaff
<i>Diploma of Merit</i>	Dr. A. Johnson
<i>Silver Medal</i>	Mr. A. W. Carpenter (Bar)
	Dr. R. L. Elliott
	Mr. H. Turner (Bar)
<i>Bronze Medal</i>	Mrs. J. M. Firth
	Mr. K. Meldrum
	Dr. J. K. Skelly
	Mr. H. W. Taylor.

"OUR GUESTS"

Mr. ALFRED W. CARPENTER (*Chairman of the Midlands Section*), in proposing this toast, said: It is my pleasing duty to convey your greetings and good wishes to our guests. I also esteem it a personal honour to be chosen to speak on behalf of one of the richest scientific societies in the world. In case such a statement leads you to doubt my mental stability, may I just affirm my belief that there are ways of assessing the standing of a company other than inspection of the balance sheet. Of great importance are items that cannot be expressed easily on paper—its achievements, its ambitions, its name in the world, the spirit that animates its workers, the friends it has made—all part of that intangible quality we call *goodwill*. You who are our guests this evening we regard as an important part of the goodwill of this Society. In this we are truly rich. We are glad to have you with us this evening as an earnest of our common interests and friendly association in high tasks.

Some of you come from the academic world. By our Associateship and Fellowship schemes and by co-operation and advice in many other educational directions we endeavour to assist you in raising intellectual standards. We thank you for your valued interest and active assistance in our work.

Some of you are industrialists. To you we are grateful that our efforts over the years in publishing and discussing research and invention in the application of colour are recognised in your encouragement to your staffs to devote their time to our Society, in the free publication of your own research, and in your generosity in very many ways.

To those representatives of Government service, we would say that we are at one with you in your desire to train greater numbers of scientists for industry; by our promulgation of fastness and quality tests we have assisted you to specify reliable standards of performance and workmanship. We cannot but feel that the influence of our *Colour Index* and of our recently formed International Relations Committee will make a valuable contribution to the prestige of this country overseas. We thank your departments for the assistance you give us in smoothing out difficulties and for your recognition of the authority of our Society to speak for Colour in its many phases.

To those of you representing kindred societies, may I say that I am sure that the mutual consultation and happy co-operation we have enjoyed

over the last few years is as great a joy to you as it is to us?

To any guests from abroad, we are happy to return, if only in part, the hospitality which so many of us have received in your native countries. We hope to renew that acquaintance at the great Congress in London next September, and look forward to a liberal exchange of knowledge that shall prove that science has no frontiers.

To you all, we thank you for the pleasant relations we have been so fortunate to maintain between the interests you represent and our own Society. They are such that most of you are here tonight, not merely as formal representatives, but also as personal friends.

Reference has been made to the fact that this Society, whose purview was once a limited area of Britain, has now extended its activities far overseas and bids fair to become the mother of a commonwealth of associated societies. This is an achievement; it is also a great responsibility.

Fifteen hundred years ago, a far flung empire, that of Rome, fell—not through lack of achievement, but because Rome itself went rotten. This is a danger that forever threatens a dispersed community. Could it happen to our Society?

We think not, and the basis for this opinion lies in the last group of guests I have to mention, those of our own members we are tonight honouring for their zeal and service. Our President has already congratulated some of the more noteworthy. I just want to mention one small select group—the honorary secretaries of the local sections. These three ladies and eight gentlemen, without fee or publicity, plug away day after day, year after year, at mundane local arrangements with a keenness and an efficiency that are almost a religion. By their efforts, each local section is transformed from a number of individual members into a friendly and happy community. It has become a pleasing custom to ask them to be our guests at these annual dinners; but their major reward is the respect and affection they gain in their contacts with their fellow members. While such a spirit exists, all is well with the Society.

Yes, we are a scientific society, a society with a serious purpose, a society that strives to work at a high level; but we are also a happy society, a community of friends with a common interest. We trust that some of this spirit has been made manifest to you, our guests, this evening. We look forward to your company on many future occasions.

Sir ERNEST W. GOODALE, C.B.E., M.C., Comp. T.I. (*President of the Textile Institute and President of the British Colour Council*), in responding to the toast, said how much he and all the other guests had enjoyed the hospitality that evening, and how much they had enjoyed listening to the excellent speeches. To be a guest is a very pleasant experience, particularly when one has so genial a host. As President of the Textile Institute he had enjoyed much hospitality, and only the previous month had been the guest at a gathering of the South African Section of the Institute in Johannesburg.

Sir Ernest continued: I am most impressed by the completion of the fourth volume of the *Colour Index*, a monumental work which has cost no small sum. This compendium, which has been produced jointly by your Society and the American Association of Textile Chemists and Colorists, has already distributed 2,500 sets in over 40 countries. In another capacity, as President of the British Colour Council, I know what work and research were necessary to compile the analogous *Dictionary of Interior Decoration Colours*, and how costly it was to produce.

As a textile manufacturer I am a greater user of colour than many, and I should like to pay tribute to the excellence of the dyes available to textile producers today.

The Society of Dyers and Colourists—considerably older than the Textile Institute with a membership of nearly 5,000—represents the technical ramifications of our great colour industry, and tribute is justly paid to the fertility and the growth of that industry and in particular to the participation by this Society of Dyers and Colourists in the immense progress achieved.

I hope that the skill and knowledge in research which are contained within the ranks of the membership of this Society not only will stimulate our efforts and our ability to meet the challenge of competition in the world of today, but will still further contribute to the pleasure and wellbeing of men and women of all nations throughout the world.

I conclude by thanking you, on behalf of all your guests here tonight, for your hospitality, and expressing the hope that all will go well with the Society in the future and that we may meet together again in this atmosphere of genial hospitality and good company which we guests have all so thoroughly enjoyed.

Dyeing Unions containing Acrylic Fibres

B. KRAMRISCH

Meetings of the Midlands Section held at the College of Technology, Leicester, on 1st October 1958, Mr. A. S. Chuley in the chair; of the Bradford Junior Branch held at the Bradford Institute of Technology on 6th November 1958, Mr. R. S. Harding in the chair; of the One-day Conference of the West Riding Section held at the Bradford Institute of Technology on 7th November 1958, Mr. R. Heaton in the chair; of the Northern Ireland Section held in the Grosvenor Rooms, Belfast on 9th December 1958, Mr. W. J. Macnab in the chair; of the Scottish Section held at the St. Enoch Hotel, Glasgow, on 13th January 1959, Mr. W. G. B. Grant in the chair; and of the Scottish Junior Branch held at the Technical College, Paisley, on 11th March 1959, Mr. C. McNeil in the chair

Methods of producing solid dyeings, two-colour effects, and reserve effects on unions containing the acrylic fibres Orlon 42, Courtelle, and Acrilan 16 and the acrylic copolymer Acrilan along with wool, cotton, and cellulosic rayons are described. Reference is made also to the dyeing of unions of Acrilan with silk, nylon, Acrilan 16, Courtelle, and Orlon 42 and furthermore unions of the latter three fibres with cellulose triacetate.

As far as Britain is concerned, the principal acrylic fibres to be taken into consideration for the textile trade at present are—

Orlon 42	(E. I. du Pont de Nemours & Co. Inc., Wilmington, Delaware, U.S.A.)
Courtelle	(Courtaulds Ltd., Coventry, England)
Acrilan 16	(Chemstrand Corp., Decatur, Alabama, U.S.A.)

(these are acrylic fibres containing at least 85% acrylonitrile)

Acrilan	(Chemstrand Corp., Decatur, Alabama, U.S.A.)
---------	---

which is a basified acrylic copolymer.

The substance of this paper refers to the above acrylic fibres, although, with possible minor modifications, the recommendations made are applicable to other acrylic fibres of similar types.

Considerable interest has been shown in the manufacture of garments made from 100% acrylic fibres mainly for knitwear for the ladies' outerwear trade. Appreciable attention has also been focussed on unions of acrylic fibres with wool, cotton, and cellulosic rayon (mainly viscose rayon staple). For example, blends have been made with wool for suitings, flannels, and pleated skirts and with spun viscose rayon and cotton for dress materials and shirtings.

I—Unions of Acrylic and Cellulosic Fibres

A. RESERVATION OF THE ACRYLIC FIBRE

Although individual dyes in any one range of dyes for cellulosic fibres tend to differ somewhat with respect to reservation of acrylic fibres, it is possible to make a few general observations on each range. For purposes of comparison the behaviour of the same groups of dyes toward secondary cellulose acetate will be taken into consideration.

(1) Direct Dyes

Direct and Chlorantine Fast dyes generally reserve or show only slight staining of acrylic fibres when applied to unions of acrylic and cellulosic fibres with the addition of salt at or near the boil. Slight differences between different types of acrylic fibre may occur, but these are liable to be influenced by the individual dye, depth and conditions of dyeing, and composition of the union.

Dyes normally classified as "C.R." (Celanese Reserve), viz. as giving maximum reservation of secondary cellulose acetate, e.g. Direct Sky Blue GS (C.I. Direct Blue 1) and Chlorantine Fast Green BLL (C.I. Direct Green 26), show better reservation of acrylic fibres than dyes such as Direct Fast Red F (C.I. Direct Red 1) and Chlorantine Fast Orange 6RL, which do not exhibit the same "C.R." properties as the former products.

(2) Developed Dyes

Many Rosanthrene and Diazo dyes show good reservation of secondary cellulose acetate and behave in a similar manner towards acrylic fibres.

(3) Sulphur Dyes

In general Pyrogene dyes stain acrylic fibres to a noticeable extent, and this is greater with Orlon 42, etc. than with Acrilan. They behave differently toward secondary cellulose acetate, which is deeply dyed as a result of saponification in the alkaline dyebath employed.

(4) Vat Dyes

Secondary cellulose acetate may be dyed heavily as a result of saponification when an alkaline dyebath is employed, as is the case when vat dyes are applied to cellulosic fibres under normal conditions. Acrylic fibres in unions generally show good reservation by vat dyes.

(5) Solubilised Vat Dyes

Cibantine dyes tend to stain acrylic fibres, and this is usually more pronounced with Acrilan than with the "straight" acrylic fibres. The extent of staining is generally less than with secondary cellulose acetate.

(6) Reactive Dyes

Cibacrons, which are hot-dyeing reactive dyes, usually show good reservation of acrylic fibres, although Acrilan is inferior to Orlon 42, etc. in this regard. Secondary cellulose acetate is dyed to an appreciable extent owing to saponification by the trisodium phosphate or other alkali used to fix the reactive dye.

(7) Azotic Combinations

The overall staining is comparable with that shown on secondary cellulose acetate as a result of

saponification by the caustic alkali used in dissolving the coupling component before application to the cellulosic fibre in the accepted manner.

B. RESERVATION OF THE CELLULOSIC FIBRE

Disperse and Basic Dyes

These represent the main classes used for dyeing straight acrylic fibres such as Orlon 42, Courtelle, and Acrilan 16.

Disperse (Cibacet) dyes have low saturation values on this type of acrylic fibre, and their use is limited mainly to light colours. Disperse dyes generally tend to show some staining of cellulosic fibres, although this varies with the individual dye, and it can often be removed by scouring with a detergent such as Ultravon JU. A more severe treatment may, however, be necessary—

0.5–1.0 g. Potassium permanganate

0.1 ml. Sulphuric acid (168°Tw.)

per litre in the cold for 15 min., followed by 0.5 ml. sodium bisulphite (66°Tw.) per litre at 30°C. for 15 min. and a final rinse.

Basic and modified basic (Deorlene) dyes may stain cellulosic fibres, and the staining may be fairly marked, so that a relatively severe clear may be required. A suggested method is to treat with—

1% Hydrosulphite BZ water-soluble CIBA

1% Formic acid (85%)

at the boil for 30 min. and then wash off. The stability of the basic dye to the clearing treatment should be checked.

Disperse and basic dyes are equally applicable to Acrilan. Disperse dyes usually build up better on Acrilan than on the straight acrylics, and the converse holds with basic dyes.

Cellulosic fibres in unions are liable to staining, but this depends on the individual dye. Clearing of the cellulosic fibre can follow similar lines to those given above. In addition the following represents an alternative method for use with Deorlene dyes on unions of Acrilan and cellulosic fibres: treat with—

1 g. Potassium permanganate

1 ml. Acetic acid (glacial)

per litre cold for 20 min., followed by 1 ml. sodium bisulphite (66°Tw.) per litre at 40–50°C. for 20 min. and a final wash-off.

Anionic (Wool) Dyes

Although many acid and chrome dyes are applicable to Orlon 42 by the cuprous-ion technique¹, the process has limited application in bulk owing to difficulties in pattern matching and reproduction of colour.

A recent patent² describes a method of dyeing acrylic fibres with metal-complex dyes such as Cibalan (1:2 complexes) in which dyeing is carried out under high-temperature conditions (125°C.) in the presence of a salt such as Glauber's salt. Dyeings of good fastness to light and wet treatments are obtained. Some staining of cellulosic fibres can occur, and this varies with the individual dye.

Most wool dyes (acid, 1:1 and 1:2 metal-complex, and chrome dyes) are applicable to Acrilan. Generally much lower pH values, often together with prolongation of the boiling period and, in the case of chrome dyes, increased amounts of dichromate and acid, are needed for Acrilan as compared with wool.

Under these conditions degradation of the cellulosic fibre might occur, especially if the dyeing process is unduly prolonged because of matching difficulties. Consequently wool dyes are not always used for unions of Acrilan and cellulosic fibres.

C. SOLID COLOURS AND TWO-COLOUR EFFECTS

(1) Combinations of Disperse with Direct or Other Cotton Dyes

Dyeing can be carried out by either the one-bath or the two-bath technique on unions containing all types of acrylic fibres.

The one-bath process is the simplest and is applicable with disperse and direct dyes in combination wherever any staining of the cellulosic fibre by the disperse dye can be disregarded. As far as possible, "acetate reserve" (C.R.) direct dyes are selected, although other factors such as fastness to light, water, washing, pleating and crease-resist finishing may have to be considered. Dyeing is carried out for 1 hr. near the boil with 10% Glauber's salt and 0.5–1 ml. of Claytaron B per litre or a similar product calculated on a 30:1 liquor ratio.

The two-bath process may be needed for the production of clear-cut contrasts.

The disperse dye is applied first for 1 hr. at the boil with the addition of 0.5–2.0 ml. of a product such as Albatex PO or Claytaron B per litre, the cellulosic fibre cleared by treatment with 0.5–1.0 g. potassium permanganate (possibly plus 0.1 ml. sulphuric acid) per litre cold for 20 min., followed by a good wash-off and treatment with 10 ml. sodium bisulphite (66°Tw.) per litre at about 30°C. for 20 min. The cellulosic fibre is then cross-dyed with direct dyes from a Glauber's salt bath at 60°C.

The wet fastness (mainly to water and perspiration) of the cellulosic component may often be improved by aftertreatment with a cationic fixing agent such as Lyofix EW. Alternatively after-copperable (Coprantine) or reactive (Cibacron) dyes can be used. With the latter range, an intermediary clear is unnecessary, as any staining of the cellulosic fibre by the disperse dye is removed by the alkali used in fixing the Cibacron dye.

In odd cases sulphur (Pyrogene) dyes can be considered for the cellulosic component, despite the cross-staining of the acrylic fibre. For instance, in the production of a full navy blue on an Acrilan-cotton fabric for drills, the cotton could be dyed first with Pyrogene Direct Blue RL (C.I. Sulphur Blue 11) as a basis, and after washing-off, the Acrilan could be cross-dyed with Cibacet dyes.

A black is not readily produced with direct-dyeing disperse dyes on any type of acrylic fibre. Satisfactory dyeings of good all-round fastness are,

however, obtainable on Acrilan by a "modified azoic process". The dyebath is set with—

2% Cibacet Diazo Black HD

3% Cibanaphthol RTO (C.I. Azoic Coupling Component 18) (previously dispersed with an equal weight of Claytavin B)

and the material dyed at the boil for 1 hr. It is then treated in a second bath set with—

8% Sodium nitrite and

14% Hydrochloric acid (sp.gr. 1.16).

Diazotisation is commenced cold, and the temperature raised to 85°C. in 10–15 min. and maintained at this value for 30 min. The diazotisation temperature may be lowered somewhat, provided that the time of treatment is extended.

Some staining of the cellulosic fibres occurs, but this can be removed by treatment with—

1% Hydrosulphite BZ CIBA water-soluble

1% Formic acid (85%)

at the boil for 15 min., followed by a final wash-off.

The cellulosic fibre can then be filled in with a direct dye at 60°C. for 30 min. in the presence of salt or cross-dyed with Coprantine or other types of dyes for cotton.

A solid black is obtainable by incorporating 3% Carbide Black E 200% special (C.I. Direct Black 38) along with the Cibacet Diazo Black HD and Cibanaphthol RTO or alternatively by cross-dyeing the cellulosic fibre with 7% Coprantine Black RLL (C.I. Direct Black 91) at 95°C. and then after-coppering. The latter method gives better wash fastness but is a longer process.

(2) Combinations containing Basic and Modified Basic (Deorlene) Dyes

Basic and modified basic dyes allow the production of a wide range of full colours including very bright colours, of good all-round fastness on Orlon 42, Courtele, and Acrilan 16. The productivity is generally lower on Acrilan. Dyeing is carried out from an ammonium sulphate or ammonium acetate dyebath containing a product such as Neolan Salt P to aid levelling.

A recent recommendation from the Chemstrand Corporation³ refers to the application of modified basic dyes to Acrilan with the addition of 3% urea in a 25:1 liquor at the boil for 1 hr. This process facilitates dye-uptake with certain products, in particular Deorlene Blue BR, and results in an improved yield.

The following Deorlene dyes have been found to be of special interest for application by this technique—

Deorlene Brilliant Yellow 5GL

Deorlene Yellow 3R

Deorlene Brilliant Reds 3B, R, 4G

Deorlene Blues BR, E5G conc.

Methylated spirits in the absence of acetic acid is recommended for dissolving basic dyes prior to application by the urea process.

Cellulosic fibres are stained by some basic and modified basic dyes, and prior to cross-dyeing with cotton dyes the staining usually needs removal as detailed under § B (p. 365). This procedure is unnecessary when the cellulosic fibre is cross-dyed with Cibacron dyes, as the alkali (trisodium

phosphate) employed in fixing the reactive dye simultaneously clears the stained cellulosic fibre.

It is not practicable to reverse the process, i.e. to dye the cellulosic fibre first with Cibacron dyes and then to cross-dye the acrylic fibre with Deorlene dyes, as the former dyes apparently act as mordants for the latter, resulting in the production of entirely different hues from those normally obtained.

Work has been carried out on the *one-bath* application of Deorlene dyes in combination with direct or Cibacron dyes to unions of acrylic fibres such as Courtele and Orlon 42 with cellulosic fibres, employing Emulsifier OC as anti-precipitant.

The dyebath is set first with 4% Emulsifier OC, followed by the Deorlene dye and the direct dye dissolved separately and 2% acetic acid (glacial). Glauber's salt will be required to fix the direct dye on the cellulosic component, and this may retard the uptake of the Deorlene dye. In applying direct dyes to cellulosic fibres, however, salt additions are usually made in practice after at least 20–30 min. dyeing, and this procedure should allow the Deorlene dye sufficient time to be taken up by the acrylic fibre. This process has proved a practical proposition in bulk working.

Unions of Acrilan and cellulosic fibres can also be dyed with combinations of Deorlene and Chlorantine Fast dyes by the one-bath technique using 3% urea and 4% Emulsifier OC.

Consideration has also been given to modifying the above process by employing reactive (Cibacron) dyes for the cellulosic component in place of direct dyes with the object of obtaining improved wet fastness. The dyebath is set with 4% Emulsifier OC followed by the Deorlene and Cibacron dyes (dissolved separately) and 2% acetic acid (glacial). After dyeing for 30–45 min. at the boil, the dyebath is cooled to 95°C., 40–100 g. common salt per litre (depending on the individual Cibacron dye) added, and dyeing continued at 95°C. for 45 min. Except in the case of Cibacron Turquoise Blue G, the dyebath is cooled further to 70°C. Trisodium phosphate (10–15 g.) is now added, and fixation allowed to proceed for 45 min., when the material is washed off and secured in 2 g. Ultravon JU per litre at 60°C. for 20 min.

This method would appear to be of interest for bright solid colours and two-colour effects. It may not be so readily applicable for light colours, as matching difficulties could arise, since the Deorlenes are comparatively bright and strong.

It should be borne in mind that individual basic and modified basic dyes, e.g. Deorlene Blue BR, are sensitive to extreme variations in pH, especially on the alkaline side.

It is important to match the colour required on the acrylic fibre first with basic dyes before making the additions of trisodium phosphate, as this type of dye should not generally be added to an alkaline dyebath.

Instead of basic and modified basic dyes, disperse (Cibacet) dyes could be considered for application along with reactive (Cibacron) dyes by the one-bath technique. No anti-precipitant is needed in this case, and the dyebath is set with

disperse and Cibacron dyes and brought to the boil. After 20–30 min. at the boil, Glauber's salt is added, followed by trisodium phosphate as given above for the previous method with Deorlene and Cibacron dyes.

This process would be confined mainly to light to medium depths on unions of straight acrylic fibres (e.g. Orlon 42 and Courttelle) with cellulosic fibres, although it could be used for fuller colours where Acrilan is used.

(3) Microfix Process

This process permits the production of solid dyeings on all types of acrylic fibres in union with cellulosic fibres. The process is at the moment confined to the production of light colours and to piece goods. The resultant dyeings are of a high standard of fastness to light and wet treatments such as washing.

The material is padded with Microfix pigment, three synthetic resin binders (Microfix Binders I, II, and III), sodium alginate, and catalyst, and subjected to a final heat-curing treatment at 140°C. for 5 min. These conditions may be varied somewhat according to the fibre, handle, and other properties desired. (A one-binder system employing Microfix Binder 59 has since been introduced. No sodium alginate is required.)

II—Unions of Acrylic Fibres and Wool

A. WOOL AND ACRILAN

Various aspects of the dyeing of unions of this type have already been published⁴⁻⁷. Solid, ingrain, two-colour, and reserve effects may be desired. As far as reserve effects are concerned, it is usually found practicable to dye the wool only and reserve the Acrilan, not *vice versa*.

There are several ways of producing solid colours and two-colour and ingrain effects, depending to some extent on the ultimate colour and fastness required.

(1) Combinations of Disperse and Wool Dyes

These are mainly employed for light colours, and either a one-bath or a two-bath technique can be employed. With the former method, combinations of disperse (Cibacet) dyes and neutral-dyeing wool dyes (Benzyl, Alizarine, or Cibalan types) come into consideration. Staining of the wool by the disperse dye is liable to occur, and to produce maximum fastness this should be cleared by a hydrosulphite treatment. Not all wool dyes withstand this type of clear, and therefore a two-bath technique may be preferred. With the latter the Acrilan is dyed first with the disperse dye, and the wool cleared and then cross-dyed.

(2) Acid Dyes

When acid dyes are applied by conventional wool-dyeing techniques, preferential dyeing of the wool usually occurs, and ingrain effects are produced. If more acidic conditions are employed, e.g. starting with 2% sulphuric acid followed by a further 6% sulphuric acid and dyeing at the boil for 60–90 min. altogether, the general tendency is for better solidity to result on the wool-Acrilan

blend. Even better results may be achieved by pretreating the union with 2 g. sulphuric acid per litre at the boil for 30 min. Individual dye selection is necessary, and some acid dyes differ in light fastness on the wool and Acrilan and under different pH values of application⁸.

(3) 1:1 Metal-complex (Neolan) Dyes

Many dyes of this type give good solidity on wool-Acrilan unions, and several methods come into consideration—

(i) Conventional wool-dyeing method, viz. 8% sulphuric acid (pH 1.9–2.1) at the boil for 90 min.

(ii) Pretreat the union with 2 g. sulphuric acid per litre at the boil for 30 min. and then dye as under (i)

(iii) Pretreat the union as under (ii), start dyeing at 50°C. with 1.5% Emulsifier OC in the dyebath, bring to the boil in 30 min., dye at the boil for 45 min., add 4% sulphuric acid, and continue at the boil for a further 45 min.

Dye selection is necessary, and methods (ii) and (iii) often result in improved solidity.

Good reservation of the Acrilan is possible by applying Neolans in the presence of 8% ammonium sulphate at the boil for 90 min., although dye selection is necessary. The normal standard of fastness and degree of levelling of the Neolans applied in this manner may be below those of the same dyes applied by the conventional technique (i). The significance of levelling differences will depend to some degree on the structure of the union.

(4) 1:2 Metal-complex (Cibalan) Dyes

If these dyes are applied by conventional techniques, viz. from a bath containing ammonium sulphate or ammonium acetate, the wool is dyed appreciably heavier than the Acrilan. Solid dyeings are produced by pretreating the union with 2 g. sulphuric acid per litre at the boil for 30 min. and then dyeing in the presence of Cibalan Salt S and Emulsifier OC. The process is, however, limited to pale colours, and dye selection is necessary.

These remarks are illustrated by the following graphs (Fig. 1–4), which relate to the behaviour of a 1% dyeing of Cibalan Blue BL (C.I. Acid Blue 168) applied to a 50:50 wool-Acrilan union under specified conditions at a series of temperatures up to the boil.

Fig. 1 (Method a)—The dye is applied by a conventional wool-dyeing method, viz. with the addition of 2% ammonium sulphate and 2% Cibalan Salt N to the bath. The function of the latter is to promote level dyeing. It will be seen that there is little uptake of dye by the Acrilan. The wool absorbs the dye progressively with rise in temperature, and even at the boil the Acrilan is only slightly stained.

Fig. 2 (Method b)—The union is pretreated with 2 g. sulphuric acid per litre at the boil for 30 min., and dyeing is carried out for 60 min. without further addition. It will be seen that the acid pretreatment has resulted in increased uptake of

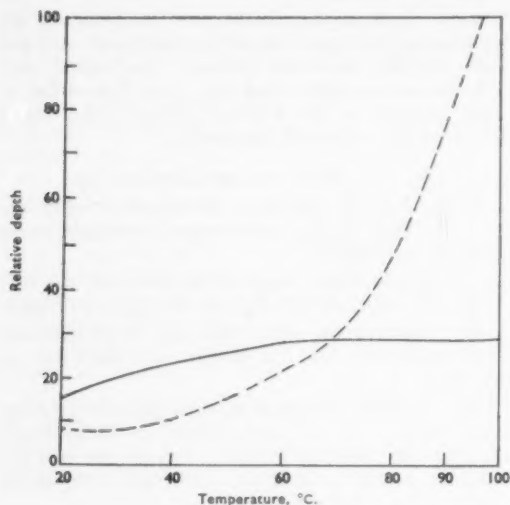


FIG. 1—Dyeing Method (a)

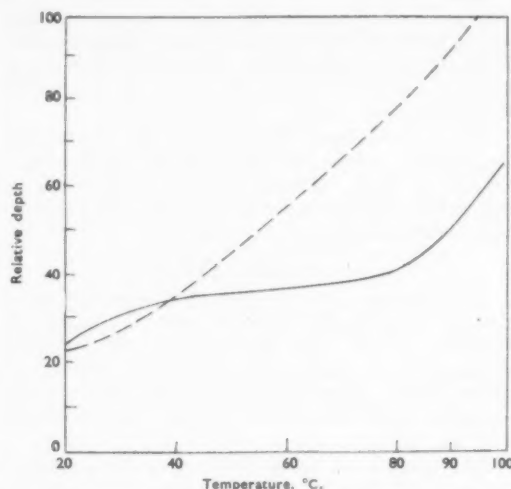


FIG. 2—Dyeing Method (b)

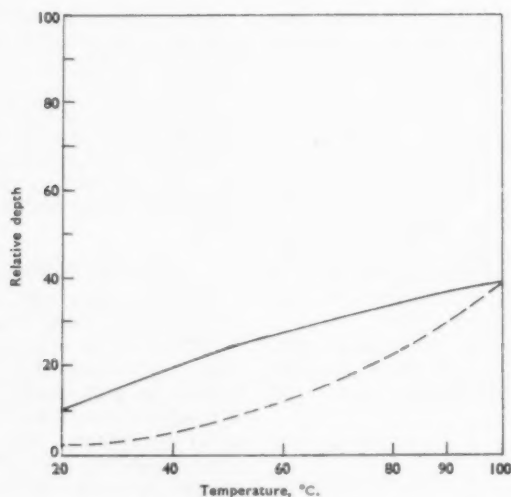


FIG. 3—Dyeing Method (c)

— Acrilan
 --- Wool

FIG. 1-3—Dyeing of 50:50 Wool-Acrilan with 1.0% Cibalan Blue BL by Methods (a)-(c)

dye by the Acrilan, and this difference is maintained as the dyeing temperature is raised progressively. The depth of colour produced on the Acrilan still remains below that on the wool even at the boil.

Fig. 3 (Method c)—Pretreatment is as before, viz. with 2 g. sulphuric acid per litre at the boil for 30 min., but dyeing is then carried out with the addition of 4% Cibalan Salt S and 1% Emulsifier OC for 60 min. The Cibalan Salt has a restraining action, mainly on the dye taken up by the wool, and at the boil the wool and the Acrilan are dyed solid.

Fig. 4 compares the dyebath exhaustion by Methods (a)-(c) based on readings on the Spekter (Hilger) photoelectric absorptiometer. It will be

seen that Method (c), which results in maximum solidity on the wool and Acrilan at the boil, also gives the least exhaustion of the dyebath.

(5) Chrome Dyes

The wool is usually dyed to a greater depth than the Acrilan in unions. In general, severer conditions as regards nature and quality of acid and period of boiling in both dyeing and chroming, coupled with increased amounts of dichromate, compared with those used in wool dyeing, are required in order to develop the chrome lake.

In some instances the following procedure gives improved solidity on the wool and Acrilan: the union is pretreated with 2 g. sulphuric acid per

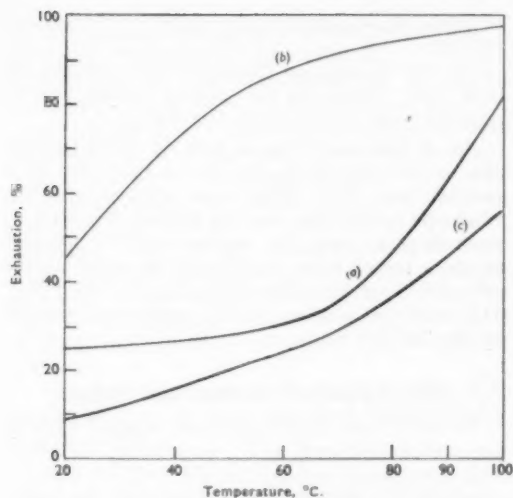


FIG. 4—Exhaustion Curves for Dyeing Methods (a)–(c)

litre at the boil for 30 min. Dyeing is then carried out with the addition of 0.5% Neovadine AN, the dyebath brought to the boil, and dyeing continued at the boil for 45 min. If needed, 2% sulphuric acid may be added to improve dyebath exhaustion and boiling continued for a further 45 min. A fresh bath is used for chroming.

(6) Reactive (Cibacron) Dyes

When applied to wool-Acrilan unions by the technique recommended for wool dyeing, Cibacrons either reserve Acrilan or show only little staining of this fibre and therefore are of interest for reserve effects. The following dyes are selected on the score of dyeability and reservation of Acrilan—

Cibacron Brilliant Yellow 3G
Cibacron Yellow R
Cibacron Brilliant Orange G
Cibacron Scarlet 2G
Cibacron Brilliant Red 3B
Cibacron Blue 3G.

The dyebath is set at 45–50°C. with—

x% Dye
x% Neovadine AL (minimum 0.5%)
1–2% Acetic acid (glacial)
1% Emulsifier OC
10–30% Glauber's salt (depending on depth of dyeing).

The bath is raised to 85–90°C. in 30 min., dyeing continued at 90°C. for 20 min., the bath then raised to the boil, and dyeing continued for 45 min. at the boil. Bright dyeings of good all-round fastness including light and washing fastness are produced.

B. WOOL AND ORLON 42, COURTELLE, OR ACRILAN 16

Solid Colours and Two-colour Effects

Two main techniques come into consideration, both of which are *two-bath methods*—

(1) Dye the acrylic fibre first with disperse (Cibacet) dyes, clear the disperse-dye staining from the wool, and then cross-dye the wool from a fresh

bath, usually with neutral-dyeing wool dyes of the Benzyl, Alizarine, and Cibalan types.

The amount of staining of the wool is often very pronounced, and may give rise to difficulties in removal. Any disperse-dye staining on the wool may result in decreased fastness.

In relatively pale colours, where staining of the wool may be only slight, sufficient clearing may be obtained by treatment with 1 g. Ultravon JF or JU per litre at 60°C. for 15–30 min. If the staining is marked, the following treatment is suggested—

0.3 g. Potassium permanganate } per litre
0.5 ml. Sulphuric acid

applied cold for 20 min., followed by a rinse, treatment with 10 ml. sodium bisulphite liquor per litre at 45°C. for 20 min., and a final rinse. The above quantities are subject to variation depending on the individual dye and the depth of dyeing.

(2) Dye the acrylic fibre first with modified basic (Deorlene) dyes, clear any staining of the wool, and then cross-dye the latter with neutral-dyeing wool dyes from a fresh bath. Deorlene dyes vary in behaviour towards wool in unions with acrylic fibres, and in several cases no clearing is needed. Where this is necessary, we would suggest treatment on the following lines—

1% Hydrosulphite BZ Water-soluble CIBA
1% Formic acid (85%)

at 90–95°C. for 15–30 min.

One-bath Method—Interest has been shown in the possibility of a one-bath process to reduce the dyeing period and at the same time make use of modified basic dyes. As Deorlene dyes are cationic, they are liable to form precipitates when employed together with wool dyes, which are anionic, and a search for a suitable anti-precipitant has been made. Various products were examined, and Emulsifier OC (a non-ionic product) appeared to show the most promise. Apart from traditional wool dyes, reactive (Cibacron) dyes were found to be applicable by this technique, and the latter are of special interest in view of the overall standard of fastness produced and the brightness of colour, which match that produced with Deorlenes on the acrylic component.

A general method is to set the dyebath with—

4% Emulsifier OC
2% Acetic acid (glacial)

Glauber's salt may be of value in some instances, e.g. with Cibacron dyes. The amount used will depend to some extent on the depth, e.g. 15% for light colours and 5% for full colours. The dyebath is brought to the boil, and boiling continued for 1 hr. Cibacrolans also are applicable.

Several points are to be noted—

(1) Deorlene dyes vary with respect to reservation of wool by the one-bath process outlined above, and can be classified roughly as under—

(a) LITTLE OR NO STAINING OF WOOL
Deorlene Brilliant Yellow 5GL
Deorlene Yellows G, 3R
Deorlene Brilliant Reds 4G, R
Deorlene Blues E5G conc., BR

(b) MODERATE STAINING OF WOOL
Deorlene Brilliant Red 3B

(c) MARKED STAINING OF WOOL
Deorlene Violet 5B
Deorlene Dark Blue R
Deorlene Green JJO.

(2) Deorlene Yellow 3R should be avoided as far as possible on the score of light fastness in mixture dyeings.

(3) As unions of wool and acrylic fibres such as Courtelle and Orlon 42 may be subjected to steam pleating, it should be noted that Deorlene Dark Blue R is liable to change in colour and Deorlene Green JJO to show staining of white acrylic fibres.

(4) Deorlene Brilliant Blue RL does not appear suitable for application by this process.

(5) Many Cibacrons are sensitive to metals such as iron and copper.

(6) In selecting dyes for the wool component, combinations of fast acid dyes such as Kiton Fast Yellow 2GRL (C.I. Acid Yellow 29), Kiton Fast Red 3GP, and Kiton Fast Blue 4GL (C.I. Acid Blue 23) are suggested for light to medium depths. Alizarine and Benzyl dyes, such as Alizarine Fast Blue BE (C.I. Acid Blue 129) for royal blues, are suggested for fuller colours. Cibacron and Cibacrolan dyes can be considered for full bright colours.

Reserve Effects

A wide range of colours of varying standards of fastness are obtainable on wool, with good reservation of Orlon 42, Courtelle, etc., from the acid, Benzyl, Neolan, Cibalan, and chrome ranges of dyes and also with most Cibacrons applied by the Neovadine AL-acid technique.

Where the converse effect is desired, viz. to dye the acrylic fibre and reserve the wool, disperse and basic dyes come into consideration. Staining of the wool can occur, however, and details regarding clearing methods are to be found under the production of solid colours and two-colour effects.

III—Unions of Acrilan and Silk

It has been stated⁹ that the newly approved mess dress for W.R.A.F. officers has been designed from Acrilan-silk grosgrain in the same colour as that used for R.A.F. officers' mess uniform. The material is a 60:40 Acrilan-silk blend and according to reports it is highly crease-resistant, does not mark easily, and can be cleaned without shrinking.

Many of the problems encountered in the dyeing of unions of Acrilan and wool apply to Acrilan and silk. There is a wide range of dyes which can be considered for the dyeing of Acrilan-silk unions, but careful selection based on individual dye behaviour and colour and fastness properties desired is necessary. The question of cross-staining must also be borne in mind. Reference will be made to only a few examples—

(1) Aggregated dyes such as Benzyl dyes and Cloth Fast Blues tend to dye the silk very much more deeply than the Acrilan.

(2) Cibalan Brilliant dyes give reasonable solidity on Acrilan and silk when applied with the

addition of 2% ammonium sulphate at the boil for 1 hr.

(3) 1:1 Complexes (Neolans) have affinity for both fibres, although the general tendency is to produce heavier dyeings on the Acrilan.

(4) A solid navy blue of good all-round fastness can be obtained by dyeing the Acrilan first with Neolan Navy Blue 2RLC conc. applied with 8% sulphuric acid at the boil for 90 min. followed by neutralisation with 5 g. sodium acetate per litre at room temperature and finally cross-dyeing the silk with Cloth Fast Blue RN conc. (C.I. Acid Blue 113) with the addition of 4% ammonium acetate at the boil for 1 hr.

IV—Unions of Acrilan and Nylon

Modified basic (Deorlene) dyes, applied with an ammonium salt such as 5% ammonium acetate or 5% ammonium sulphate at the boil for 60 min., result in the Acrilan being dyed and the nylon reserved or only slightly stained. Any cross-staining so produced can be removed reasonably well by treatment with 1 g. potassium permanganate and 1 ml. glacial acetic acid per litre at 25°C. for 20 min. followed by 10 ml. sodium bisulphite per litre at 55–60°C. for 20 min.

Cibalan Brilliant dyes applied from a neutral dyebath containing only 2% Cibalan Salt N at the boil for 1 hr. dye the nylon with virtually complete reservation of the Acrilan.

By dyeing the Acrilan first with Deorlene dyes, clearing the stained nylon, and then cross-dyeing the latter with Cibalan Brilliant dyes, solid colours and two-colour effects are obtainable.

An alternative method of producing solid colours on unions of Acrilan and nylon is to use 1:1 metal-complex (Neolan) dyes applied in the normal manner as for wool, viz. with 8% sulphuric acid at the boil for 90 min.

Careful dye selection is, however, necessary, and for most mode shades a six-dye combination is necessary, using two yellows, two reds, and two blues in order to achieve solidity on the two fibres—

Yellow	Neolan Yellows BE and RE (C.I. Acid Yellows 54 and 104)
Red	Neolan Reds BRE and REG (C.I. Acid Reds 212 and 198)
Blue	Neolan Blues FR and 2R (C.I. Acid Blues 160 and 154)

The behaviour of the individual dyes is as under—

Neolan Yellow RE	Nylon redder and fuller than Acrilan
Neolan Yellow BE	Nylon greener and weaker than Acrilan
Neolan Red BRE	Nylon very much weaker but reasonably in tone with Acrilan
Neolan Red REG	Nylon very much heavier but reasonably in tone with Acrilan
Neolan Blue FR	Nylon greener and somewhat weaker than Acrilan
Neolan Blue 2R	Nylon redder and somewhat fuller than Acrilan.

The proportions of the individual dyes are liable to variation depending on the composition of the blend.

V—Unions of Acrilan with Acrilan 16, Courtele, or Orlon 42

Solid colours and two-colour effects can be produced on unions of these two fibres by applying wool, Cibacron, or Cibacrolan dyes together with Deorlene dyes by a one-bath acid dyeing technique with Emulsifier OC as anti-precipitant. The wool or reactive dyes dye the Acrilan, and the Deorlene dyes dye the Acrilan 16, Courtele, or Orlon 42 with little cross-staining. Attention has, however, to be given to dye selection and limitation in depth of colour to achieve the best results. Cibacrons vary in the degree of fastness to light obtained on Acrilan, and therefore individual dye selection is necessary.

A suggested method is to set the dyebath with the two types of dyes, dissolved independently, together with—

1.0% Emulsifier OC
3.0% Formic acid (85%) at 50°C.

Raise to the boil and maintain at the boil for 20 min., add 3% sulphuric acid, continue at the boil for 20 min., add a further 3% sulphuric acid, and complete dyeing after an additional 30 min. at the boil. Rinse, and scour with, per litre—

1.0% Ultravon JU
0.25% Ammonia (sp.gr. 0.88)

for 20 min., and give a final rinse.

A process of this type would be of interest where two-colour effects are required on an all-acrylic union.

VI—Unions of Courtele, Orlon 42, or Acrilan 16 with Cellulose Triacetate

Interest has been shown in unions of this type for the dress goods trade. A suggested method for obtaining a range of colours, especially medium to full bright colours, is to combine disperse (Cibacel) dyes for the triacetate with modified basic (Deorlene) dyes for the acrylic component. A one-bath technique can be used employing acetic acid to apply the basic dye and Emulsifier OC to prevent any possible precipitation between the cationic basic dye and any anionic dispersing agent which may be present as diluent in the disperse dye. A satisfactory standard of fastness to light, washing, and perspiration is readily obtainable by attention to dye selection. Fastness to steam pleating is often required, and care is necessary in selecting suitable dyes, especially from the disperse range.

* * *

I acknowledge my indebtedness to CIBA Clayton Ltd. for permission to publish this paper and to Mr. F. Grainger and Mr. D. G. Evans for their assistance.

CIBA CLAYTON LTD.
MANCHESTER 11

(MS. received 11th March 1959)

References

- ¹ Feild and Fremon, *Text. Research J.*, **21**, 531 (1951).
- ² Kunstzijdespinnerij Nyma NV. (assignors to Courtaulds Ltd.), BP 777,534.
- ³ Chemstrand Corp., *Man-made Textiles*, **35**, 53 (Sept. 1958).

⁴ Kramrisch, J.S.D.C., **73**, 85 (1957).

⁵ Stern and Schmidlin, *S.V.F. Fachorgan*, **13**, 110 (1958).

⁶ Hindle, J.S.D.C., **74**, 151 (1958).

⁷ Lister, J.S.D.C., **74**, 158 (1958).

⁸ Hadfield and Sokol, J.S.D.C., **74**, 629 (1958).

⁹ *Dyer*, **120**, 46 (1958).

Discussion

MIDLANDS SECTION

Mr. L. A. TELESZ: Is it necessary to select dyes for freedom from cross-staining when applying basic and direct dyes to unions of acrylic and cellulosic fibres by the one-bath process? If the cellulosic fibre is stained, is a clearing process advisable?

Mr. KRAMRISCH: It is preferable to select dyes from both ranges which show minimum cross-staining; otherwise clearing may be necessary.

Mr. H. W. PARTRIDGE: In dyeing wool-Acrilan unions with Neolan dyes, is there any difference in light fastness on the two substrates?

Mr. KRAMRISCH: In several cases the fastness to light is not as good on Acrilan as on wool, and we normally recommend these dyes on this union for medium and full depths.

Mr. PARTRIDGE: Is there any distinction between Orlon 42, Courtele, and Acrilan 16 as regards dyeing properties?

Mr. KRAMRISCH: Although there is general similarity between the dyeing properties of these fibres, some differences may arise, e.g. differential uptake with basic dyes in full colours.

Mr. S. M. JAECKEL: The lecturer made reference to the application of vat dyes on cellulosic fibres to reserve acrylic fibres. To what extent can they be applied to acrylic fibres?

Mr. KRAMRISCH: Methods have been proposed for applying vat dyes to acrylic fibres, but it is thought that they will be of limited interest.

Mr. D. O. DOUGLAS: Is the urea process mentioned for the application of modified basic dyes to Acrilan suitable also for Courtele?

Mr. KRAMRISCH: This technique has not proved useful for fibres such as Courtele and Orlon 42.

Mr. C. W. BRIAN: Temperature control is usually recommended in dyeing and finishing acrylic fibres because of their thermoplastic nature. Does this apply also to unions containing these fibres?

Mr. KRAMRISCH: It is advisable to exercise temperature control at all stages in processing unions containing acrylic fibres, including slow cooling after dyeing.

Mr. N. GEE: Was any retarder employed in the single-bath Orlon-wool dyeings?

Mr. KRAMRISCH: No retarder was used in our work. If any retarder should be considered necessary for the modified basic dye, prior tests with individual products would be advisable.

Mr. J. WARDLE: Does the period of dyeing on depth of shade at the boil influence the amount of Emulsifier OC to be used in the one-bath process?

Mr. KRAMRISCH: We have not observed any differences in this regard.

Dr. W. L. LEAD: How was Emulsifier OC selected as the anti-precipitant in the one-bath process with anionic and cationic dyes?

Mr. KRAMRISCH: Various products were examined, and Emulsifier OC proved the most effective.

Mr. R. J. VANN: How is it possible to correct faulty dyeings on union materials containing acrylic fibre?

Mr. KRAMRISCH: It is impossible to make any general statement. Each case has to be considered on its merits by taking into consideration the resistance of the individual dyes on the components of the union to different stripping techniques.

Mr. A. S. CLULEY: We have come across an instance of Courtelee absorbing the degradation product of a direct cotton dye on stripping. Is there any explanation for this behaviour?

Mr. KRAMRISCH: We have not encountered this phenomenon, and would have to investigate the actual case.

Dr. LEAD: What is the standard of fastness and levelling obtained with Neolan dyes when applied to wool-Acrlan unions in the presence of ammonium sulphate with the object of reserving the Acrlan?

Mr. KRAMRISCH: The fastness and the levelling tend to be inferior to those obtained with dyeings prepared by standard techniques (8% sulphuric acid) to achieve solidity on the wool and Acrlan.

Mr. F. CHARLES: Is there much danger of flotation of yarn due to frothing when Emulsifier OC is used?

Mr. KRAMRISCH: This could arise.

Mr. TELESZ: Should frothing occur, would alcohols be useful in counteracting this property?

Mr. KRAMRISCH: Each product would have to be examined individually.

WEST RIDING SECTION

Mr. H. W. PARTRIDGE: Does the use of trisodium phosphate in the dyeing of acrylic-cellulosic blends have any adverse effect upon the handle of the acrylic fibre?

Mr. KRAMRISCH: This point has not been raised before, and I am unable to make any observations at this stage.

Mr. H. BROADBENT: How can a good white be obtained on acrylic fibres?

Mr. KRAMRISCH: Treatment with 2-5% formic acid at the boil for 30 min. can be used to improve the white on Orlon 42, Courtelee, Acrlan 16, etc. An even better white is obtainable with fluorescent brightening agents such as Uvitex U and A applied in the formic acid bath. Acrlan requires sodium chlorite, but the white produced is not too stable to heat treatment and the action of light.

Mr. L. ROBISHAW: In dyeing acrylic-cellulosic unions with basic and reactive dyes, will the cost of the fabric withstand the expense of the dyes?

Mr. KRAMRISCH: Particularly with many bright medium to full colours such as turquoise, jade green, pink, etc., this procedure probably represents one of the few methods of obtaining adequate

brightness coupled with a satisfactory standard of fastness to light, washing, and pleating on both types of fibres in the union.

Mr. W. BEAL: Can formic acid be used to diazotise a black dye on an Acrlan-viscose rayon union? This acid is less harmful to the fibre than the hydrochloric acid suggested.

Mr. KRAMRISCH: According to our tests hydrochloric acid can be replaced by formic acid, and the resultant dyeings are equally fast to steam pleating.

Mr. J. V. BUTCHER: Could Mr. Kramrisch give further details of the single-bath technique for dyeing acrylic-cellulosic blends with mixtures of modified basic and reactive dyes?

Mr. KRAMRISCH: The dyebath is prepared with basic (Deorlene) and reactive (Cibacron) dyes dissolved separately, Emulsifier OC, and acetic acid. After dyeing at the boil for 30-45 min. the dyebath is cooled to 95°C., common salt added, and dyeing continued at 95°C. for a further 45 min. This is followed by fixation of the reactive dye with trisodium phosphate and a final wash-off and scour.

NORTHERN IRELAND SECTION

Mr. W. J. MACNAB: In the application of the disperse diazo black to Acrlan-viscose rayon by the modified azoic technique, 14% hydrochloric acid is suggested. Could any other acid be used to avoid any possible danger from the hydrochloric acid?

Mr. KRAMRISCH: According to our tests, formic acid represents a satisfactory alternative.

Mr. J. PORTER: What are the minimum amount of sulphuric acid, time, and temperature for safety in the dyeing of Acrlan-viscose rayon when dyes of the acid milling type are used for the Acrlan component?

Mr. KRAMRISCH: A low pH and 1 hr. at the boil are usually necessary to produce satisfactory dyeings, otherwise "ring dyeing" of the Acrlan may occur. The danger arises in shading to pattern, as the boiling period is liable to be extended and the viscose rayon may be affected thereby. For this reason disperse or basic dyes are preferable for dyeing the Acrlan in unions with viscose rayon.

Mr. PORTER: Can the linen in linen-Acrlan unions be dyed with vat dyes without the caustic soda used damaging the Acrlan?

Mr. KRAMRISCH: We have not yet investigated this point.

Dr. M. GEWING: Would it be feasible to supply union dyes or dye mixtures for use by the one-bath process?

Mr. KRAMRISCH: This hardly represents a practical proposition in view of the wide ranges of dyes which come into consideration.

Dr. GEWING: What is the garment dyer to do—if he is at all able to identify the fibres?

Mr. KRAMRISCH: Garments composed of unions of acrylic fibres, even if they are suitably labelled or identified, represent a very difficult problem for the garment dyer, and in many cases their dyeing is not a practical proposition at all.

Dr. GEWING: Are the processes described already in bulk operation?

Mr. KRAMRISCH: A number of bulk trials have already shown promising results.

Mr. P. F. MACNAB: To what extent will the Siroset process for permanently pleating wool affect the use of acrylic fibres in acrylic-wool unions where the acrylic fibre is used for obtaining the pleating effect?

Mr. KRAMRISCH: It is not possible to draw a strict comparison. Whereas the object of the Siroset process is to impart a durable pleat in all-wool materials, the introduction of an acrylic fibre in unions with wool may not be made only with this object in view, but may also be intended to utilise other specific physical properties of the acrylic fibre. Furthermore, with a union of wool and an acrylic fibre it is possible to produce two-colour effects by suitable dyeing techniques.

Dr. J. K. SKELLY: Are the controlled cooling conditions recommended after dyeing acrylic fibres as critical for 50:50 cellulosic-acrylic fibre blends as for all-acrylic fibres? Further, in the case of two-stage dyeing processes is controlled cooling required where the dyebath temperature is dropped at the end of the first stage?

Mr. KRAMRISCH: Slow cooling after dyeing is advisable at all stages with acrylic fibres whether alone or in unions, although it is perhaps not so critical in the latter case.

Dr. SKELLY: Under what pH conditions do Cibacron dyes react with or reserve acrylic, wool, and cellulosic fibres?

Mr. KRAMRISCH: Cibacrons do not dye acrylic fibres such as Orlon 42 and Courtele. They have affinity for Acrilan under acid conditions, but in general the light fastness is appreciably lower than with the same dyes on cotton or wool. Acid conditions are used for applying Cibacron dyes to wool, and under these conditions reservation or only slight staining of all types of acrylic fibres occurs with most members of the range. Alkaline conditions are employed in the application of Cibacron dyes to cellulosic fibres, and in general a

good degree of reservation of all types of acrylic fibres in unions is obtained.

SCOTTISH SECTION

Mr. A. R. MCINNES: Does the fibre play any part in the one-bath process employing Emulsifier OC as anti-precipitant?

Mr. KRAMRISCH: Any effect of the substrate can be ignored in this technique.

Mr. W. G. B. GRANT: Is it possible to produce solid colours on unions of Acrilan and nylon?

Mr. KRAMRISCH: Two techniques are possible—

(1) Dye the Acrilan first with cationic (basic) dyes, clear any staining of the nylon with acid potassium permanganate, and then cross-dye the nylon with neutral-dyeing wool dyes.

(2) Use selected 1:1 metal-complex dyes applied from a sulphuric acid bath.

Mr. P. SCHWARZENBACH: Can a black be produced on a union of Courtele together with both viscose rayon and secondary cellulose acetate, preferably dyeing at about 80°C. on account of the cellulose acetate component?

Mr. KRAMRISCH: It may be possible to find a method of using suitable basic, direct, and disperse dyes to give a black on this union at the boil, but it is questionable whether this would be possible at 80°C.

Mr. D. G. EVANS: A further extension of the use of Emulsifier OC is that it can be considered for preventing precipitation, which may otherwise occur between a cationic dye and the anionic dispersing agent used with disperse dyes.

Mr. G. G. CAVEN: Which techniques are suggested for bulk application to the production of solid colours on Acrilan-wool unions?

Mr. KRAMRISCH: 1:2 Metal-complex dyes can be used for light colours applied by acid pretreatment and subsequent dyeing along with products such as Cibalan Salt S together with Emulsifier OC, and for medium and full colours 1:1 metal-complex dyes can be applied in the normal manner as for wool. Individual dye selection is required.

The Dyeing of Polyester Fibres and Blends

H. W. PARTRIDGE

One-day Conference of the West Riding Section held at the Bradford Institute of Technology on 7th November 1958, Mr. R. Heaton in the chair

The first part of this paper reviews the methods at present employed in dyeing yarns and hosiery composed of 100% polyester fibre. The use of disperse dyes in conjunction with carriers and the adoption of high-temperature dyeing methods in the application of disperse dyes and azoic combinations are discussed, with descriptions of the machines employed. The second part of the paper is devoted to the methods employed in the dyeing of blends of polyester fibres with wool, cotton, and nylon.

A tremendous amount of information on the dyeing of polyester fibres has been made available both in this country and in the United States during the past few years. In 1954 ICI published a second edition of their manual on this subject¹ of some eighty pages, and subsequent research and experience would provide material for a volume several times that size.

The present paper will be limited to the more practical aspects of the subject, and further will be confined largely to the section of the industry in which the author has had personal experience, viz. the dyeing of yarns and hosiery. Nevertheless, much of the paper will be equally applicable to other fields of polyester fibre dyeing. It will refer primarily to Terylene (ICI) polyester fibre, although

the dyeing properties of Dacron (DuP) are closely similar, if not identical.

Owing to the absence of chemically reactive groups from Terylene, the classes of dyes available for its coloration are in general limited to the disperse dyes and certain azoic combinations. In addition, it is possible to apply selected vat dyes at 130°C. in an unreduced condition or as their acid leuco compounds, while solubilised vat dyes—e.g. Soledons (ICI) and Cibantines (Ciba)—can be applied to Terylene-cotton fabrics by padding. Pigment dispersions may also be padded on to Terylene fabric in conjunction with appropriate binders, and fixed by baking.

DISPERSE DYES ON 100% TERYLENE

Although the equilibrium absorption capacity of Terylene for disperse dyes is greater than that of nylon, their rate of diffusion into the fibre is very much lower, and dark colours of adequate fastness cannot be obtained by normal dyeing methods. By selecting the most rapidly diffusing disperse dyes, e.g.—

- C.I. Disperse Orange 3
- C.I. Disperse Red 15
- C.I. Disperse Violet 1
- C.I. Disperse Blue 26

however, it is possible to dye light to medium depths at 100°C. in conventional dyeing machines. The resulting fastness to washing, steaming, and dry heat treatments is in general lower than that obtained with more slowly diffusing dyes applied by special methods, but the wet fastness is much higher than that of the same dyes on nylon, and this method is quite suitable for many of the lighter hosiery colours.

Plain continuous-filament Terylene has not been found very acceptable for men's footwear owing to its hardness and non-absorbency, but spun Terylene staple yarns have been used quite extensively for this class of goods, and more recently crimped ("bulked") Terylene yarns have become popular, particularly for the production of fancy effects in conjunction with crimped nylon. They are usually dyed in side-paddle machines of improved Gorrie design. The latest machines of this type are equipped with variable-speed gears and are totally enclosed, enabling a vigorous boil to be maintained.

About two years ago an attempt was made to introduce Terylene as a competitor to nylon in ladies' fully fashioned hose. The panel was knitted with a 25-denier, 3-filament yarn, heavier multifil yarns of lower filament denier being used in the welts and feet. After preboarding and scouring it was found possible to dye these hose at the boil in conventional hosiery colours without the use of carriers. These stockings, however, did not prove popular, largely owing to their lack of recoverability from distortion, and soon passed out of fashion.

Carrier Dyeing

For men's half hose it is of course necessary to use carriers in order to obtain the deeper colours.

Carriers are organic compounds which increase the rate of diffusion of disperse dyes into the fibre, and various theories have been put forward to explain their mode of operation²⁻⁴. A wide variety of organic compounds are capable of acting as carriers, including phenolic derivatives such as *o*- and *p*-phenylphenol (2- and 4-hydroxy-diphenyl), carboxylic acids such as benzoic, dichlorobenzoic, and salicylic acids, aromatic hydrocarbons and chlorinated hydrocarbons such as diphenyl, mono- and di-chlorobenzene, and chlorotoluenes, and amines such as diphenylamine. The majority of these compounds, however, have disadvantages which render them unsuitable for commercial application. Many are too costly for economic use. Benzoic and salicylic acids, for example, must be used in concentrations of up to 20 g./litre. Many of the chlorinated derivatives are toxic, while other effective carriers are difficult to remove from the fibre, resulting in objectionable residual odours or reduction in light fastness of the dyeing. Thus we found that residual diphenylamine would cause a dyeing of C.I. Disperse Blue 26 to change to a grey on exposure to light. *p*-Phenylphenol has a less extreme effect but substantially reduces the light fastness of many disperse dyes.

Two of the most effective carriers for general purposes are diphenyl and *o*-phenylphenol. Where diphenyl is used it is most important, although by no means easy, to ensure its complete removal after dyeing, since residual traces leave an objectionable odour in the goods and reduce the fastness to sublimation of the dyeing. We experienced considerable trouble at one time when we were using diphenyl as a carrier in dyeing spun Terylene half hose, the dye volatilising from dark dyeings on to the hosiery press and marking back on to other dyeings of Terylene and nylon which were pressed subsequently. *o*-Phenylphenol is more easily removed, particularly by alkaline treatments, and is a very satisfactory carrier when used in a concentration of 3 g./litre.

o-Phenylphenol itself is insoluble in water, but it readily dissolves in caustic soda to form a sodium salt. In that form it is ineffective as a carrier and must be acidified with acetic acid to a pH of 6.0–6.5 before use, an anionic dispersing agent being added to maintain the free phenol in a state of dispersion. This acidification may be carried out before or after addition to the dyebath. It is essential that the carrier is effectively emulsified. If by any mischance concentrated carrier is deposited on the fibre, the resultant local swelling will produce deeply coloured "carrier spots". This effect may, for example, be produced by a condensate of liquid carrier on the upper part of a machine dripping back on to the goods. This may be avoided by starting the dyeing on the alkaline side and liberating the free phenol by gradual addition of acid at the boil.

After dyeing, particularly with dark colours, it is often found that a small amount of disperse dye remains unfixed on the surface of the fibre. This can be removed by a reduction-clearing treatment without affecting the dye which has penetrated into

the fibre. The most effective method consists in treating with caustic soda, hydrosulphite, and Lissolamine A 50% (ICI) or an equivalent product (each at a concentration of 2 g./litre) at 60°C. for 20–30 min. In the case of loose fibre and slubbing there is a risk of tendering under such conditions, and the temperature should be restricted to 50°C.

The dyeings should finally be soaped at, or near, the boil.

Dyeing at 120–130°C.

The rate of diffusion of disperse dyes into Terylene increases rapidly with increase of temperature, and dark colours can be dyed with comparatively slowly diffusing dyes in normal dyeing times without the use of carriers if dyeings are carried out at 120–130°C. In addition to improved colour yield, this method results in better levelling and higher wet fastness. This process, of course, necessitates the use of special dyeing equipment, but in view of the disadvantages of carrier dyeing we have found it worth while to install a full range of pressurised dyeing machines for dyeing all our Terylene yarns.

After preliminary trials we designed and built an entirely new dyehouse for this type of work. It consists essentially of two storeys, the machines being so mounted on the ground floor as to project to a convenient working height above the upper floor. This floor also houses the dyers' office, a matching room equipped with daylight lamps, and dye store with direct access to the yard. A travelling hoist enables the frames and cages to be moved to any part of the dyehouse and lowered to the ground floor for loading and unloading. A vacuum plant is provided with points between the machines on to which containers can be lowered for extraction after dyeing. The machines are equipped with temperature and time regulators and recorders to ensure adequate control of processing. All services—water, steam, vacuum, and waste—are carried between the upper and ground floors for easy access for maintenance.

Various types of machines are available for high-temperature yarn dyeing. We use both the Longclose and the Pegg types, the latter being constructed on the Steverlynck system. With adequately sealed equipment, it is possible, of course, to raise the temperature above 100°C. without the application of any external pressure. Volatilisation of dye liquor may, however, occur in the low-pressure region behind the circulating pump with resultant loss of efficiency. This can be prevented to some extent by sealing the machine at 70–80°C., thus developing a static pressure by compression of the entrapped air, but application of external pressure by means of compressed air, as provided in the Steverlynck system, is a distinct advantage. Another technique is utilised in the Jagri machines, where the gaseous phase is excluded, and direct fluid pressure is applied by means of a weighted piston.

The layout of a Steverlynck machine is illustrated in Fig. 1. The dye bath is prepared in the expansion tank (1) and delivered by the pump (2) through the heat exchanger (3) and the reversing valve (4)

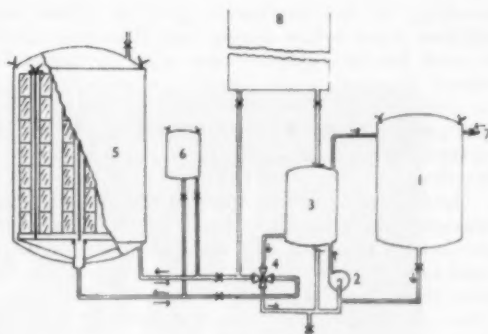


FIG. 1—Steverlynck Machine

to the dye vessel (5). According to the position of the valve (4) the dye liquor may be passed through the cheeses from inside to outside or *vice versa*. A proportional volume of liquor is simultaneously circulated through a single specimen cheese in the container (6) for sampling. From the dye vessel the liquor returns to the pump for recirculation. Shading additions are made to the expansion tank (1), through which only a small proportion of liquor circulates during normal running. The heat-exchange vessel (3) is fitted with coils (not shown) for steam heating and cold-water cooling. The system is pressurised by the introduction of compressed air through the valve (7). A reserve tank (8) is provided to which the dye liquor may be pumped for temporary storage.

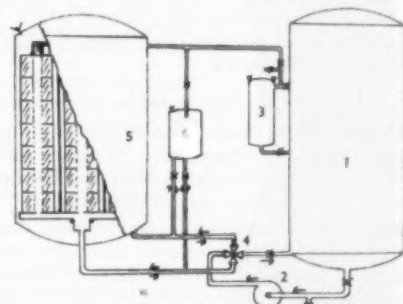


FIG. 2—Longclose Machine

Fig. 2 illustrates the system on which our Longclose machines operate. The pump (2) circulates the dye liquor through the reversing valve (4), the dye vessel (5), and the specimen container (6), but on return the whole of the liquor passes through the tank (1), which contains the heating and cooling coils. Dye and chemical additions are introduced into the system through the small subsidiary vessel (3), which may be isolated for the purpose.

Machines such as the above are suitable for dyeing all types of Terylene yarns at temperatures up to 130°C. Colours are first matched on single-cheese machines, which are also in great demand for sample dyeing. Spun yarns are best dyed in cheese form. In order to obtain level dyeings it is most important that all cheeses should be evenly wound, and to ensure this we do all our own

winding. It is desirable to give the cheese an efficient scour before dyeing, but if caustic alkali is used for this purpose care must be taken to ensure thorough neutralisation before proceeding to dye at high temperatures. An anionic dispersing agent may be used with advantage in the dyebath to assist dispersion of the dye and improve levelling.

Continuous-filament yarns can be dyed either as cheeses or in the form of mock cakes. The latter are mounted on "top hat" formers similar to those used for viscose rayon cake dyeing. It is advisable that these forms should be of stainless steel rather than synthetic resin, since the latter tend to deteriorate at high temperatures and, moreover, may occlude dye, which will diffuse out when they are subsequently used for dyeing a lighter colour. In dyeing viscose rayon cakes the swelling of the package in water ensures a good seal; the absence of such swelling in Terylene may result in channelling of the liquor if the cake is not an exact fit on the holder or if its construction allows any contraction in height during dyeing.

Non-stretch textured yarns such as Taslan may also be dyed on cheese if fully relaxed before being wound for dyeing. Stretch or crimp Terylene yarns such as Flufelene, however, are wound into hanks, relaxed into the form of muffs, and dyed in annular cages as designed for loose-stock dyeing. If they were dyed in a stretched condition in cheese form at high temperatures, the crimp would be seriously impaired. These yarns are often used for knitting patterned half hose in conjunction with nylon which may subsequently be cross-dyed, and dyes of high wet fastness must be selected.

Pad-Fix Methods

An alternative method of ensuring rapid diffusion of disperse dyes into Terylene is to apply the dye to the surface of the fibre at conventional temperatures and subsequently submit the material to a high-temperature treatment. In the early days of Terylene (1949) we developed and patented a technique in which we applied disperse dyes from a soap bath at 80°C. and developed full colours by steaming at pressures of 25–40 lb./sq.in.⁵

A similar principle is applied in the Thermosol (DuP) process, in which the Terylene is padded with disperse dyes and subsequently heat-treated, while Imperial Chemical Industries Ltd. have recently recommended a similar technique in the application of disperse dyes in conjunction with Procions to Terylene-cellulosic fibre mixtures⁶.

AZOIC DYES

A limited range of azoic combinations are suitable for dyeing Terylene. A number of bases can be used in conjunction with 3,2-hydroxynaphthoic acid, applied as dispersions at the boil, and subsequently diazotised and coupled, and the range may be extended by the use of selected arylamides of this acid applied at 130°C.

The available bases fall into two groups—those of low molecular weight such as *p*-nitroaniline, which may be applied at 100°C. without a carrier;

and those of higher molecular weight such as C.I. Disperse Black 1 and C.I. Azoic Diazo Component 48, which require the presence of a carrier or a temperature above 100°C. The former may be applied in the same bath as 3,2-hydroxynaphthoic acid, but the latter produce tars under such conditions and must be applied in a separate bath. In the single-bath process the Terylene is boiled with a dispersion of the base for 20–30 min. before addition of the naphthoic acid, and dyeing is continued at the boil for a further hour. It is essential that the pH of the bath should be maintained at approx. 3.8 to ensure adequate exhaustion of the coupling component. After rinsing, diazotisation and coupling are effected by treatment in 8% nitrite and 12% hydrochloric acid (32°Tw.), starting cold and warming to 85°C. The operation is completed by a reduction-clear at 50°C. followed by "soaping" at 80°C. with soda (2 g./litre) and an anionic detergent (1 g./litre). In the two-bath process the first bath is dropped and the Terylene rinsed before applying the 3,2-hydroxynaphthoic acid.

In yarn dyeing in pressurised machines a one-bath process may be used to apply the more complex bases in conjunction with selected arylamides. It has been suggested² that the absence of tar formation is due to the blocking of the carboxylic group of the naphthoic acid, preventing salt formation with the base. Blacks may be obtained with C.I. Disperse Black 1 and C.I. Azoic Coupling Component 18, and navy blues with C.I. Azoic Diazo Component 48 and C.I. Azoic Coupling Component 19. In the case of the black, dyeing is commenced at 85°C. with the disperse black in the presence of an anionic dispersing agent (2 g./litre), and after 10 min. at 120°C. the coupling component is added as a fine dispersion. The temperature is then raised to 130°C. and dyeing continued for 45 min. at a pH between 6.5 and 8.0. After dyeing, the yarn is given a cold rinse in caustic soda (1 g./litre), and the colour developed by diazotising with 6–8% nitrite and 11–14% hydrochloric acid, starting cold and raising the temperature to 85–90°C. This is followed by a reduction-clear and a final soaping. If difficulty is encountered in obtaining a satisfactory dispersion of the coupling component, the latter may be dissolved in the minimum amount of caustic soda and added as the sodium salt. The free coupling component is liberated by addition of acetic acid at 130°C., bringing the pH to 6.5–7.5. The blue combination is applied in a similar manner, but a higher temperature and a longer time are required for adequate diazotisation and coupling.

The use of high-temperature dyeing with arylamides offers advantages over the 3,2-hydroxynaphthoic acid method in shorter dyeing times, savings in dyes and auxiliaries, and improved fastness properties. Thus the navy produced with 3,2-hydroxynaphthoic acid has a light fastness of only 3, while with C.I. Coupling Component 19 a fastness of 6 is obtained.

Certain azoic combinations on Terylene unfortunately suffer from a serious defect when

CEROL

BRANDS

Waterproofing Agents

CEROL E Substantive one bath proof for cellulosic fibres and wool. Especially suitable for garments. Soft handle.

CEROL S For all materials. Produces a very pleasant soft handle. Excellent for wool gabardines.

CEROL T Excellent one bath proof for all materials. Non-substantive. Specially recommended for garments. Medium handle.

CEROL TFS Very stable one bath proof for all materials, especially for heavy canvas such as tents and awnings. Compatible with fillers for extra stiffness.

CEROL WB High degree of proof for cellulosic materials. Fast to boiling soap and dry cleaning. Soft handle. Specially for high-class garments.

CEROL Z Excellent wash fastness on synthetic fibres. Suitable for use with thermo-setting resins.



Sandoz
Products Ltd.
Bradford



Special Purpose Chemicals for Textiles



Pentrone T

Sulphated Alcohol—
for the scouring,
cleansing and
penetrating of
all classes
of textiles



Pentrosans A.2 A.3 & A.4

Levelling, Dispersing
and Retarding
Agents for use
in dyeing



Resistone K. W.

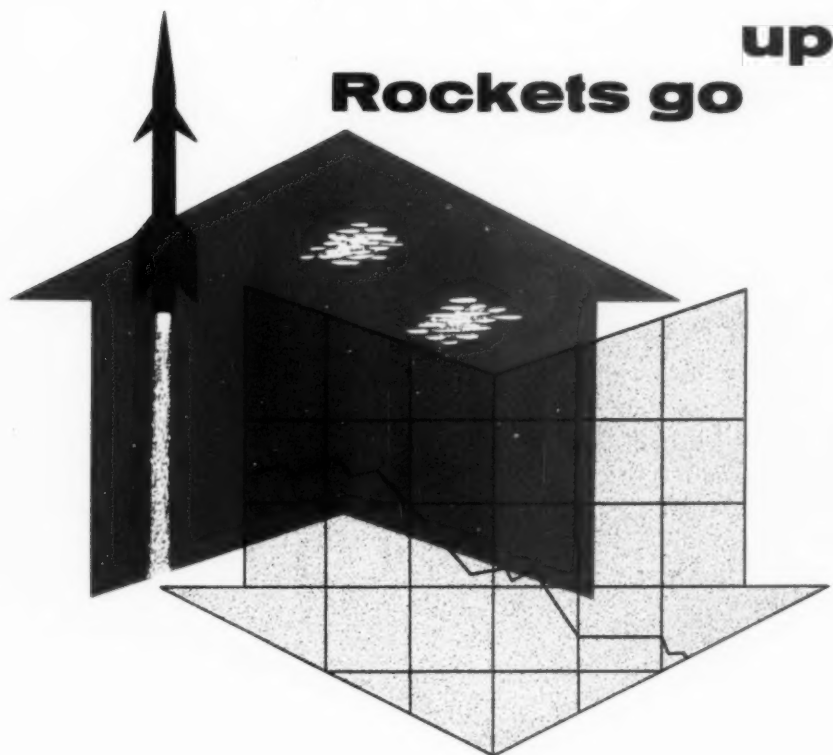
Resist for wool and
nylon in unions.
Essential for best
results with two
colour effects

GLOVERS

(CHEMICALS) LIMITED



WORTLEY LOW MILLS, LEEDS 12 TELEPHONE : 63-7847/8/9 TELEGRAMS : GLOVERS, WORTLEY, LEEDS



Bleaching costs come down

A vital power force for rockets...a safe bleaching agent for all fibres. These are only two of the many applications for Laporte hydrogen peroxide. Increased production is meeting this growing demand and helping to lower your bleaching costs by supplying you with hydrogen peroxide at greatly reduced prices. Laporte Textile Technical Service Department will be pleased to give advice on individual bleaching problems.

with

LAPORTE HYDROGEN PEROXIDE

Laporte Chemicals Ltd., Luton.

Telephone: Luton 4390



HARDMAN & HOLDEN LTD

For **SODIUM HYDROSULPHITE**

**A FIRST CLASS
STABLE PRODUCT
OFFERED WITH FIRST CLASS SERVICE**

**STOCKPOINTS
LONDON · MANCHESTER · GLASGOW · BELFAST**

HARDMAN & HOLDEN LIMITED
Manox House, Miles Platting, Manchester 10
TEL. COLLYHURST 1551 (10 LINES)
GRAMS. 'OXIDE' MANCHESTER



Quality Dyes & Products

*Excellent basis for heavy brown shades on
loose wool, slubbing and yarns*

ELITE FAST RED BROWN V CONC

Excellent wet fastness

Suitable for bordeaux shades on silk and nylon

L·B·H
& Co Ltd

For Samples and Quotations apply
L B HOLLIDAY & CO LTD HUDDERSFIELD

SUPERWOSOL

SUITABLE FOR PAD JIG
PAD STEAM and
PACKAGE DYEING

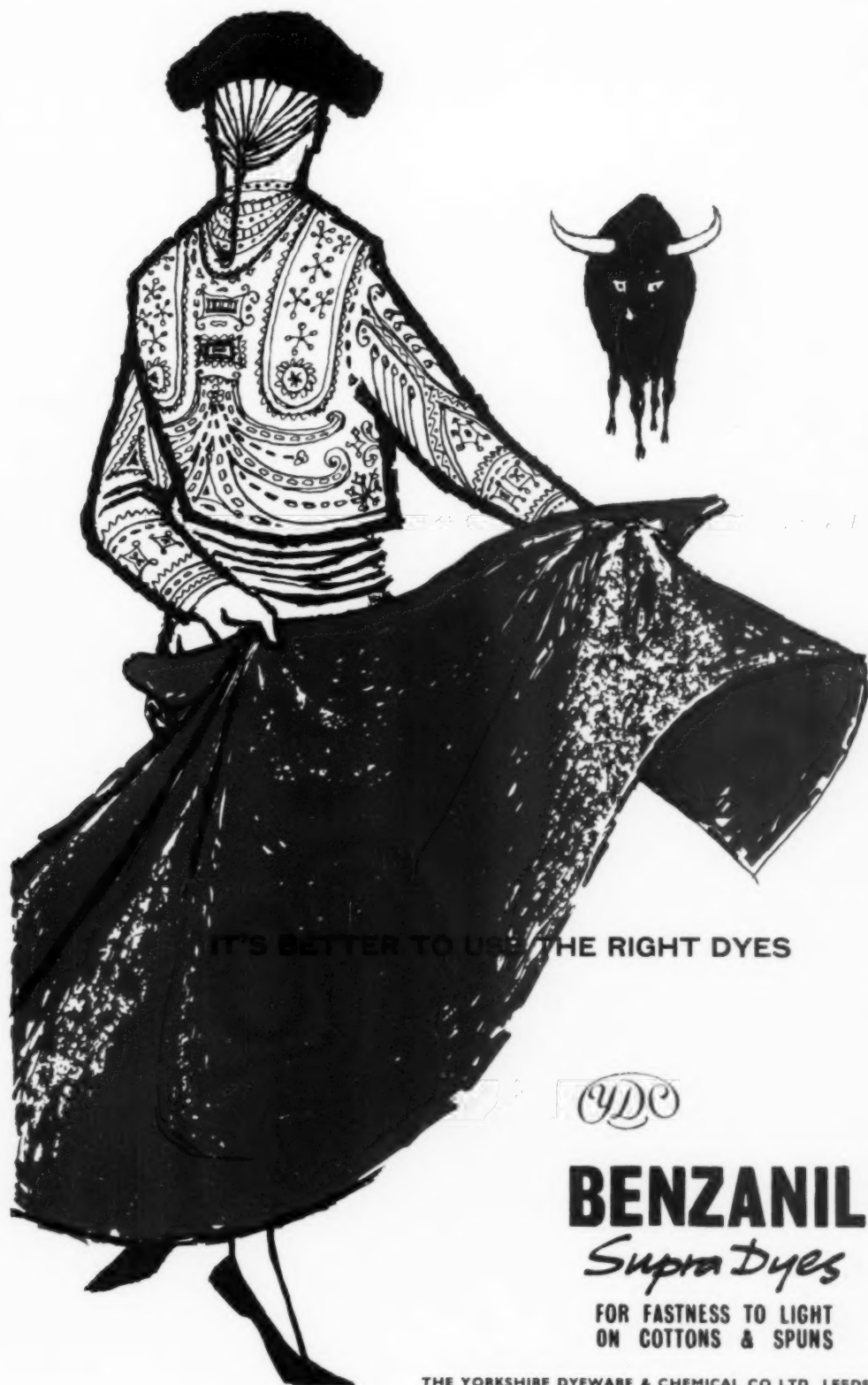
Water soluble sulphur dyes giving
GOOD PENETRATION
BETTER HANDLE
EASY WASHING-OFF
LESS TROUBLESOME EFFLUENT

DYESTUFFS

JR
bCo LTD

JAMES ROBINSON & CO LTD
HILLHOUSE LANE HUDDERSFIELD
ENGLAND

Telephone Huddersfield 334 and 335
Telegrams ROBINSON HUDDERSFIELD



IT'S BETTER TO USE THE RIGHT DYES



BENZANIL

Supra Dyes

FOR FASTNESS TO LIGHT
ON COTTONS & SPUNS

THE YORKSHIRE DYEWARE & CHEMICAL CO LTD LEEDS

Sapamine WL

Softening Agent for
Textile Fabrics

particularly effective for
facilitating raising operations

CIBA CLAYTON LIMITED

Clayton Manchester 11
Telephone East 1341 (16 lines)
Telegrams Cibadyes Manchester 11

**Sole Concessionaire in the U.K.
for CIBA Ltd Basle Switzerland**

C I B A

Andrew

The Auto-Setter

- AUTOMATIC OPERATION OF VACUUM, STEAMING AND EXHAUST CYCLES
- THERMOSTATIC TEMPERATURE CONTROLLER
- TEMPERATURE RECORDER
- ENSURES UNIFORM STEAMING CONDITIONS
- SIX MONTHS GUARANTEE

Controls easily adjusted to give double steaming and vacuum cycles as recommended by Messrs Joseph Bancroft & Sons Co (England) Ltd, for processing "Ban-Lon"

High pressure model for garments

Low pressure model for ladies' hosiery with capacity of 100 dozens plus

Gas fired or electrode steam generating units available

Further details of the Auto-Setter or Girland Plasticiser from —

THE



**ENGINEERING & DEVELOPMENT
COMPANY LIMITED**

Manufacturers of Hosiery Dyeing and Finishing Machinery
Jennison Street · Bulwell · Nottingham
Telephone 27-8566 (4 lines)



MYSTOX



Research

IS A PART OF OUR SERVICE

FINDING A SPECIALISED ROT-PROOFING FORMULA FOR YOUR PRODUCT

As vital as the effectiveness of Lauryl Pentachlorophenol is its supreme versatility. In some specialised presentation, at a particular concentration, lies the answer to your product's rot-proofing requirements. It is part of our service, by specialised research undertaken in our own laboratories, to provide you with that answer—and to formulate it specially for you as a MYSTOX presentation.

* **Lauryl Pentachlorophenol**—also known as *Lauryl Pentachlorophenate* and *Pentachlorophenyl Laurate*—is approved by the Home Office, the Ministry of Supply, the Ministry of Food, the Ministry of Defence, the Ministry of Works, the National Coal Board and many Overseas Governments' Departments as a bactericide, fungicide and insecticide for a variety of applications, including

**ALL TEXTILES · PACKAGING
MATERIALS · CANVAS AND
CORDAGE · PAPER · ELECTRICAL
COMPONENTS · TIMBER**

THE FIRST NAME FOR LAURYL PENTACHLORPHENOL *

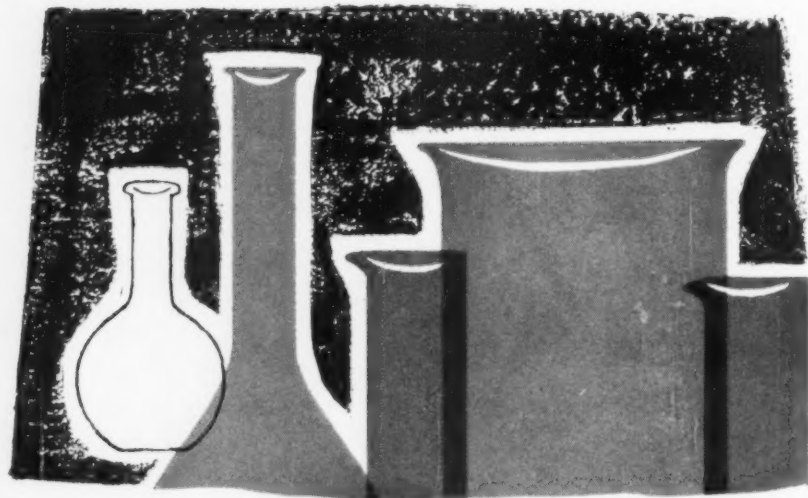
Manufactured in various forms
to suit individual users by

CATOMANCE LTD

94 BRIDGE ROAD EAST

WELWYN GARDEN CITY, HERTS.

Tel: Welwyn Garden 4373



DIASTORAN

ENZYME desizing agents

Efficient, economical and easy to use

S CONC, S 24 & S 1 Products of various strengths for the removal of Starch sizes.

G & GA As above but specially formulated for use on Gelatine, Glue and Casein.

The

HEXORAN

Company Limited



UNITY WORKS · BELPER · DERBYSHIRE

Telephone Belper 471

Telegrams PROGRESS BELPER

Your skill and new

brotasul

produce finer printing

Our new Brotasul is a formaldehyde sulphonylate compound which has been designed to help you overcome certain difficulties associated with the more traditional sulphonylates.

For example, there is no "halo" effect when Brotasul is used in the discharge printing of fine filament acetate fabrics. Brotasul offers advantages in the printing of fabrics containing fibres of cellulose acetate, triacetate, nylon, silk and wool. Brotasul has no tendering effect on wool, and it has a very low solubility.

May we tell you more about this new product? Please write to us for full information.



Brotasul by Brotherton

Brotherton & Company Limited is a member of the Associated Chemical Companies Group and all inquiries should be made to Associated Chemical Companies (Sales) Limited (the Sales Company of British Chrome & Chemicals Limited and Brotherton & Company Limited), at P.O. Box 6 Leeds

Telephone Leeds 29321-8

Telegrams ASCHEM LEEDS



***Cibalan Standard - A Recognized Standard - A Fast Standard**

The dyer of high-quality wool styles demands

- high fastness
- preservation of fibre quality
- short dyeing time
- good levelling and penetration

These demands are met by Cibalan dyes

Cibalan Dyes are also used for dyeing polyamide fibres, silk, Acrilan,* and unions of Acrilan and wool employing Cibalan Salt S, and for sisal

Cibalan dyes are original CIBA products

CIBA CLAYTON LIMITED
Clayton Manchester 11
Telephone East 1341 (16 lines)
Telegrams Cibadyes Manchester 11

Sole Concessionaire in the U.K.
for CIBA Ltd Basle Switzerland

©Registered trade-mark

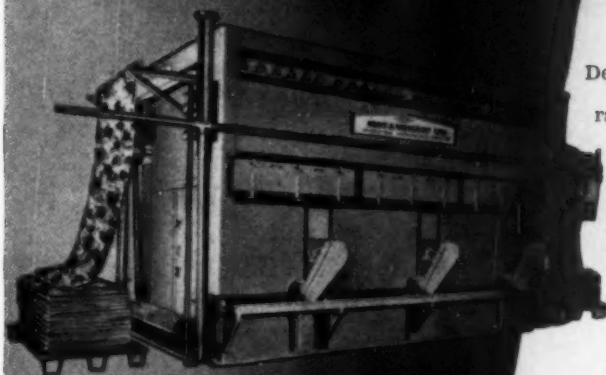
* Trade-mark of Chemstrand Corporation
Decatur (Ala.) U.S.A.

C I B A

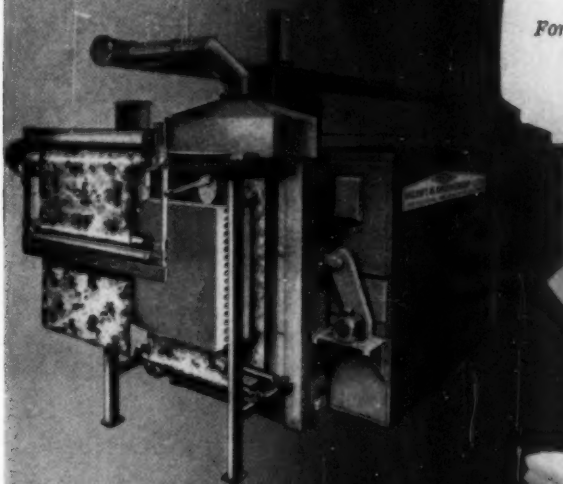


BAKING MACHINES

for all **Resin Finishes**



200 yds capacity Roller type machine



240 yds capacity Loop type machine

Designed to handle the lightest rayons or the heaviest cotton

drills, Hunt and Moscrop

Baking Machines are

designed specifically to

meet customers own

requirements with

capacities up to 100 yds

per minute and for

temperatures up to 420 F.

For further information please

send for leaflet JD/19

HUNT & MOSCROP LTD

P.O. Box No. 8, Widdowson, Manchester 14, England. Telephone 2476-7-8



DURAZOL gives the GREEN LIGHT for dyeing



Durazol Greens D, 5B, BL and 5G
are homogeneous direct dyestuffs giving a wide range of
green shades with high light-fastness.

Highly suitable for application to all forms of cotton and
viscose rayon, including union fabrics, the Durazol Greens are
level-dyeing and give good solidity of shade.

Recommended for furnishings.

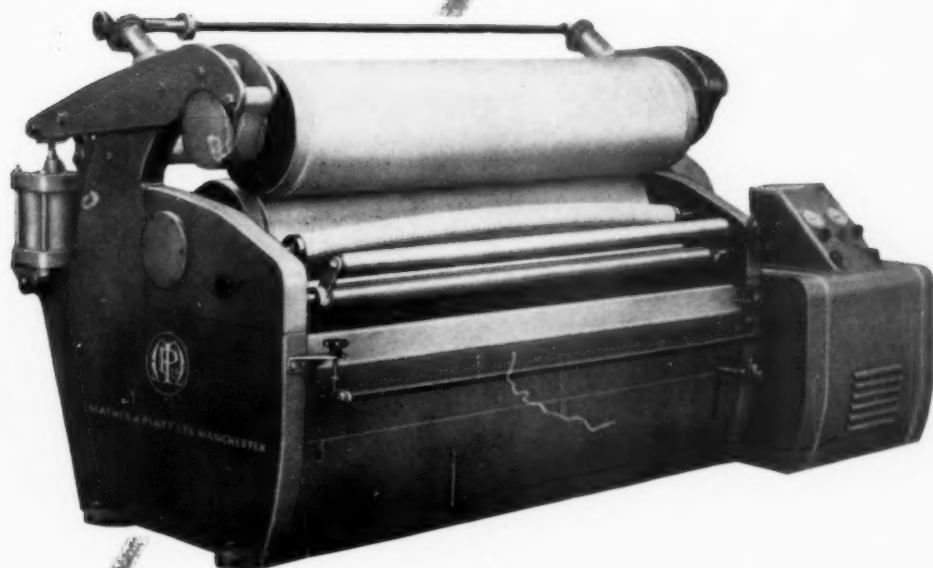
DURAZOL GREENS D · 5B · BL · 5G

Full technical information on request

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON SW1 · ENGLAND

D 771

It's a question of design



Sound design for efficiency and reliability with the minimum of maintenance. The two-bowl pneumatic off-set padding mangle illustrated is one of the modern machines in our complete range of bleaching, dyeing, printing and finishing machinery. Large diameter bowls with a skewing arrangement for the top bowl ensure even padding with level expression at all loads. Independent pressure adjustment is provided for each side with a quick-action on-off device for pressures up to ten tons.

Mather & Platt
LIMITED

934

**PARK WORKS
MANCHESTER 10**

*Telephone COLlyhurst 2321**Telegrams MATHER MANCHESTER*

Antisnag for nylon



Gyosin NH

Gyosin NH is economical and simple to apply. It gives nylons unparalleled snag resistance with a firm and pleasing handle. Owing to its preferential affinity for nylon, build-up of resin deposits on the dye-bags is extremely slight. Use Gyosin NH for trim-shop convenience.

Geigy

The Geigy Company Ltd Rhodes Middleton Manchester



A



BEGINS WITH



You can make absolutely certain of success in your textile dyeing, wet processing and finishing by specifying textile auxiliaries from "S.U.C." Our range includes many products already well established in the textile industry and proved to be consistently good, and if you are meeting with some complication that demands individual research our chemists will be pleased to give your problem their special attention.

STOCKPORT UNITED CHEMICAL CO. LTD.

A Member of the Associated Chemical Companies Limited Group

CANADA STREET • HEAVILEY • STOCKPORT • STEPPING HILL 2980

TECHNICAL
ESTIMATES
LITERATURE
RESEARCH



**RANGES OF
REPUTATION**

DURAMINE and EVRON FAST
ACID DYESTUFFS

AZONINE and DURANTINE FAST
DIRECT DYESTUFFS

Town End Chemical Works Limited

BRAMLEY • LEEDS T3

submitted to heat-setting or steaming processes, as for example the preboarding of hosiery. Under such conditions aggregation and migration of the pigment occur, with resultant flattening of the colour and reduction in fastness to rubbing. The scarlet produced with *p*-nitroaniline and 3,2-hydroxynaphthoic acid is particularly susceptible to this defect.

VAT DYES

Vat dyes are not applicable to Terylene by normal alkaline leuco methods, but selected vat dyes may be applied at 130°C. in unreduced pigment form in a similar manner to disperse dyes. With e.g. C.I. Vat Red 1 or C.I. Vat Red 41, extremely bright dyeings of outstanding fastness to wet treatments, steaming, and dry heat may be obtained. Alternatively, the vat dye may be applied in a similar manner as a dispersion of its acid leuco compound, which is then oxidised.

The Dyeing of Terylene Blends

TERYLENE-WOOL

Although mixtures of Terylene and wool offer the opportunity of two-colour effects in the half hose trade, the chief demand is for solid shades on yarn for weaving patterned fabrics. The presence of the wool fibre prevents the use of azoic combinations, severely limits the possibilities of high-temperature dyeing, and necessitates the omission of the caustic reduction-clear. In general the Terylene is dyed with selected disperse dyes, and the wool with milling acid, metal-complex, or chrome dyes.

For several years we have been successfully dyeing Terylene-wool yarns in cheese form. These yarns are usually woven into patterned fabrics, which are often subjected to pleating operations, and the dyes must therefore be fast to piece scouring and pleating as well as to light and rubbing. The main difficulty lies in the staining of the wool by the disperse dyes used for the Terylene. If not adequately cleared, such staining will result in reduced fastness to all these agencies. Selection of disperse dyes must therefore be based not only on their fastness properties on Terylene but also on their lack of staining of the wool component. Among the dyes suitable for this purpose are—

- C.I. Disperse Yellow 39
- C.I. Disperse Orange 1
- C.I. Disperse Red 11
- C.I. Disperse Blue 26.

The yarn is first given a normal wool scour at 50°C. and then dyed at the boil with a suitable carrier such as *o*-phenylphenol. Light colours may be dyed by a one-bath process, milling acid or metal-complex dyes being applied to the wool together with disperse dyes for the Terylene, but for dark colours a two-bath process is essential. In the majority of cases the Terylene dyebath may be set with dyes and dispersed acidified carrier and gradually raised to the boil. An alternative method is to start with the necessary amount of acid present and to add the carrier in the form

of its sodium salt in portions after the dyebath has been raised to the boil. The latter technique has been found particularly advantageous in preventing the formation of carrier stains in the dyeing of piece goods on the winch.

When the single-bath method is used, the staining of the wool may be cleared by a treatment with potassium permanganate acidified with sulphuric acid. The temperature is raised to 40°C., and the brown stain of manganese dioxide removed by the addition of sodium bisulphite. If the two-bath process is used, it is possible to clear before dyeing the wool, and in that case a reduction process is preferred, using ammonia, sodium hydrosulphite, and Dispersol VL (ICI) or similar agent. The wool is then dyed in the usual way with acid, metal-complex, or chrome dyes and, in the case of dark colours, finally "soaped" with an anionic detergent at 70°C. It should be noted that certain disperse dyes are capable of reacting with dichromate with a resultant change in colour. C.I. Disperse Reds 11 and 15 are particularly sensitive, and should be replaced by C.I. Disperse Red 13 if the wool is to be chrome-dyed.

TERYLENE-COTTON

Considerably less difficulty is encountered in dyeing blends of Terylene with cellulosic fibres. If fastness requirements are not high, light to medium depths may be dyed by a one-bath process using the more rapidly diffusing disperse dyes for the Terylene and direct dyes for the cotton. Deeper and faster colours may be produced by the use of more slowly diffusing dyes in the presence of a carrier, in conjunction with aftertreated direct dyes such as Cuprofix (S), Cuprophenyl (Gy), and Coprantine (Ciba) dyes. In this case a two-bath method is preferable, a reduction-clear being given before dyeing the cotton.

Direct cotton dyes, even if aftertreated, are not adequate for the fastest class of work, and we usually dye Terylene-cotton blended yarns on cheese by a two-bath process with disperse and vat dyes. The Terylene is first dyed at 130°C. with selected disperse dyes in the usual way, and the cotton is subsequently vat-dyed in a fresh bath. There is no need for an intermediate clear to remove the staining of the disperse dye from the cotton, as the hydrosulphite vat performs this function adequately. The vat dye is usually applied in the leuco form at the normal dyeing temperature, but if penetration difficulties are encountered a pigment-impregnation technique may be adopted. For reds and maroons an azoic combination may be used for dyeing the cotton, after a reduction-clear, the yarn being given a salt rinse after the coupling component bath. Reactive dyes may also be applied to the cotton by the usual techniques, after first dyeing the Terylene.

Fabric Dyeing

The above methods are equally applicable to fabrics, the Terylene being dyed at 100°C. with the aid of a carrier if pressurised equipment is not available. Recently, however, Imperial Chemical Industries Ltd. have introduced a continuous dyeing

method⁶ in which the fabric is padded through a solution containing disperse dyes, reactive dyes, urea, dispersing agent, and thickener, with the addition of either sodium bicarbonate or soda ash according to the type of reactive dye employed. The reactive dye is fixed on the drier, and the disperse dye by subsequent baking at 175–190°C. Alternatively, the hot-dyeing brands of reactive dye may be fixed by a steam treatment.

Solubilised Vat Dyes

Although these dyes do not normally dye Terylene, fast coloration of Terylene-cotton fabrics in pale colours can be obtained by padding. The fabric is padded with a solution containing the dye and nitrite, developed with sulphuric acid, washed, neutralised, and soaped, the temperature of padding and developing depending upon the particular dye employed.

Pigments

Terylene-cotton fabrics may also be dyed in light to medium depths by padding with recently introduced pigment dispersions such as Microfix (Ciba), Printofix (S), or Helizarin (BASF) in conjunction with the appropriate binders, and subsequently curing at 140°C.

TERYLENE-NYLON

Terylene is frequently used in conjunction with nylon in the form of crimped or stretch yarns for the production of fancy effects in men's half hose. These may be knitted with predyed Terylene and undyed nylon, with both yarns undyed, or with a pattern of predyed Terylene in conjunction with undyed Terylene and undyed nylon.

In the first case the nylon is cross-dyed with either disperse, acid, or metal-complex dyes. If the Terylene has been predyed to a dark colour, light to medium depths may be produced on the nylon with disperse dyes, but for dark colours on the nylon, acid or metal-complex dyes must be used to ensure adequate wash fastness. These dyes must also be used on the nylon if the Terylene has been predyed to a light colour, to avoid staining of the latter.

When both fibres are undyed, the dyer is normally restricted to comparatively light colours on the Terylene, usually with the addition of a carrier to influence the partition of the disperse dye in favour of the Terylene. Prolonging the dyeing time also assists in achieving this result. The nylon is cross-dyed to a darker colour in the same or a fresh bath with anionic dyes. If the depth required on the nylon is not substantially heavier than that on the Terylene, it is necessary to clear the disperse dye from the nylon by a reduction treatment before cross-dyeing. In certain cases the dyer may be required to leave the Terylene white. Although anionic dyes do not dye Terylene, many cause appreciable staining, and careful selection is necessary to ensure a good white reserve.

A limited range of three-colour effects can be obtained by including a pattern of Terylene predyed to a dark colour. The undyed Terylene may then be dyed to an appropriate pale colour, and the nylon cross-dyed with anionic dyes to a contrasting colour.

TERYLENE-CELLULOSE ACETATE

With appropriate modification the above techniques may be applied to mixtures of Terylene with secondary cellulose acetate and cellulose triacetate.

* * *

The author wishes to express his thanks to the Directors of Messrs. Stevensons (Dyers) Ltd. for permission to present this paper.

STEVENSONS (DYERS) LTD.
AMBERGATE
DERBYSHIRE

(MS. received 8th December 1958)

References

- ¹ ICI, *The Dyeing of "Terylene" Polyester Fibre* (2nd edition 1954).
- ² Fern and Hadfield, *J.S.D.C.*, **71**, 840 (1955).
- ³ Vickerstaff, *Hexagon Digest*, (20), 7 (Oct. 1954).
- ⁴ Schuler, *Text. Research J.*, **27**, 352 (1957).
- ⁵ Stevensons (Dyers) Ltd., Partridge, and Key, *BP* 659,667.
- ⁶ ICI, *Technical Information*, Dyehouse No. 423 and 436.

The Finishing of Fabrics containing Wool blended with Terylene or Acrylic Fibres

C. S. WHEWELL

One-day Conference of the West Riding Section held at the Bradford Institute of Technology on 7th November 1958, Dr. R. L. Elliott in the chair

An account is given of modern practice in the finishing of fabrics containing wool blended with polyester or acrylic fibres, together with the new data relating to the changes in dimensions of wool-Terylene blended fabrics during finishing and to certain physical properties of the finished cloths.

At the outset it must be emphasised that the finishing of fabrics containing both wool and acrylic or polyester fibres is very much in its infancy. There is little doubt that the optimum methods for finishing most types of these blended fabrics have not yet been found. An appreciable amount of work has, however, been carried out in

the last few years, and the purpose of this paper is to give an account of what is known and to indicate possible trends for future work.

The technique adopted in finishing does, of course, depend on the handle and the finish desired, but in most instances the aim has been to obtain a fabric which is as much like wool as

TABLE I

	64s Wool	Terylene Staple Fibre	Courtelle	Acrilan	Orlon
Specific gravity	1.32	1.38	1.15	1.17	1.17
Dry tenacity, g./denier	1.4	3.5-4.0	3.4	2.5	2.3
Extension at break, %	38	25-40	40-45	35	28
Wet tenacity Dry tenacity $\times 100$	76	100	71	80	—
Moisture regain at 64%	16	0.4	1.3-1.8	1.2-1.6	1-2
R.H., %					
Young's modulus, g./denier	28	50-55	43	—	—

possible. Consequently, finishers generally adopt what is considered to be good wool practice modified as little as possible because of the presence of the man-made fibre. This approach has been quite successful, although it will not be adequate if new and interesting effects are desired. The modifications which have to be introduced are determined by the chemical and physical properties of the fibres in the cloth. Often, however, wool is the most sensitive fibre in the blend, and the conditions which can be used are chosen so that the wool is not adversely affected. The physical and chemical characteristics of the man-made fibres do, nevertheless, limit the effectiveness of some well established processes. Some of the more important characteristics of the various polyester and acrylic fibres available in England are summarised in Table I.

Basic fibre, yarn, and fabric properties must be considered when developing a finishing routine, e.g.—

(a) Wool fibres are more susceptible to the action of moisture than are man-made fibres. The rôle of moisture in the finishing of blended cloths, therefore, becomes less important the greater is the percentage of man-made fibre in the blend. Conversely, because man-made fibres are thermoplastic, the effects of heat become more pronounced as the percentage of man-made fibre in the blend increases. In fabrics containing large amounts of man-made fibre, heat is often a more potent finishing agency than moisture.

(b) At room temperature the load-extension curves of acrylic fibres are rather like those of wool, but the softening temperature of these fibres is about 70°C. The fibres are highly extensible in hot water even under low loads. For example, in water at 21°C. a tension of 0.43 g./denier will stretch an Orlon fibre by 1%; in water at 93°C. a tension of only 0.0025 g./denier will stretch the fibre by the same amount¹. Consequently, care should be taken to avoid pulling, stretching, or deforming fabrics containing appreciable amounts of Orlon in hot aqueous media. Similar care is necessary when handling most other types of acrylic fibres.

(c) Man-made fibres, particularly the acrylics, can be heat-set and are, therefore, suitable for making "high-bulk" yarns by blending set and unset fibres in the yarn, and then relaxing the yarn under appropriate conditions. The development of high-bulk yarns is an important one, which has not yet been fully exploited. Terylene is also strong and suitable for making high-bulk yarns by the false-twist, stuffer-box, and other recently

developed techniques. These yarns have new and interesting properties, and will find important uses in fabrics containing wool. The finishing of such materials requires special consideration if the best results are to be obtained.

SETTING TECHNIQUES

If blended cloth contains less than 10% of man-made fibre, no change in the wool routine is necessary. Many worsted fabrics are greatly improved by being set, but most traditional woollen cloths are not set. The processes available are dry blowing, crabbing, wet blowing or steaming, and high-pressure steaming. Such treatments reduce fabric shrinkage, prevent subsequent distortion in scouring and dyeing, and in addition minimise the possibility of creasing.

With blended fabrics there is an increasing tendency to prefer dry blowing to other setting methods, often because of the danger of dyes bleeding. Other setting treatments may also affect the dye affinity in localised areas, e.g. near the holes on the cylinder when fabrics are wet-blown. Blowing, like other setting processes, however, does sometimes fix oil stains, and it is therefore advisable to remove these first by local spotting. As indicated earlier, fabrics containing large amounts of acrylic fibres must not be subjected to high tensions when hot or wet. When being set on a blowing machine, these fabrics should, therefore, be thoroughly cooled at the pump before they are taken off the machine and cuttled. Otherwise creases and cuttle marks which are difficult to remove are introduced. Instead of being set in the usual way, fabrics containing acrylics are often, with advantage, relaxed at about 100°C. in open width before they are scoured. This helps to prevent the formation of rope marks.

SCOURING

The conventional methods of scouring woollen and worsted fabrics can usually be employed successfully on blended fabrics, but attention to several points will repay consideration.

Cleanliness

Wool-acrylic blended fabrics are easily scoured, and the rate of oil removal is similar to that from an all-wool cloth. Wool-Terylene blended cloths are, however, sometimes more difficult to scour² than corresponding wool fabrics, because of the comparatively high adhesion between combing oil and Terylene. This is evident from the results

given in Table II, in which are listed the amounts of olive oil remaining in various blended cloths after they have been subjected to a laboratory soap and sodium carbonate scour.

TABLE II
Removal of Olive Oil from Wool-Terylene Blended Fabrics by a Laboratory Scour

Fabric*	Wool (%)	Oil removed (%)
A	100	49.1
B	80	44.0
C	60	38.1
D	40	31.7
E	20	24.6
F	0 (100% Terylene)	15.8

* Construction—

Warp: 2/36s worsted counts; 60 ends/in.

Weft: 2/36s worsted counts; 60 picks/in.

Weave: 2/2 twill.

In cases where oil removal is difficult, the severity of the scour should be increased, or alternatively oil-soluble polar compounds such as Lissapol NX (ICI) should be incorporated in the oil. For example, when oiled patterns were subjected to a laboratory scour, 54% of the oil applied was removed in the case of olive oil, but the corresponding figure for a blend of 90% olive oil and 10% Lissapol NX was 88%.

Shrinkage

In general, the greater the proportion of Terylene or acrylic fibre in the blend the smaller is the shrinkage which takes place during scouring³. The difference between the all-wool cloth and the all-Terylene cloth is, of course, dependent on the construction of the fabric, but fabrics containing less than 40% of wool shrink comparatively little. The figures given in Table III illustrate the differences to be expected.

TABLE III
Composition of Fabric (%) Area Shrinkage during Scouring (%)

WOOL-TERYLENE		
100	0	6.6
80	20	5.3
60	40	3.6
40	60	2.1
20	80	1.4
0	100	0.3
WOOL-COURTELLE		
100	0	9.2
80	20	6.0
60	40	2.5
40	60	2.5
20	80	1.0
0	100	1.0

Because acrylic fibres are easily extended even under low loads, care should be taken to avoid undue stretching of the fabrics during scouring, and treatment at high temperature is undesirable.

Creasing

Although presetting the fabrics helps to reduce crease formation during scouring, it is desirable to keep the temperature of scouring and washing-off as low as possible, compatible with obtaining a clean piece. Creases inserted at high temperatures tend to become permanent. Fabrics should also be cooled gradually. In some cases, although seldom, open-width scouring is advisable.

High-bulk Cloths

These fabrics require special care if maximum bulk or loftiness is to be obtained. The "bulk" should be developed before the scouring is commenced, or permanent creases will be formed. It is good practice to allow the fabric in book form

TABLE IV
Milling Shrinkage of Wool-Terylene Blended Fabrics

Fabric*	Area Shrinkage (%) after milling for—							
	30 min.	60 min.	90 min.	120 min.	150 min.	180 min.	210 min.	240 min.
WATER MILLING								
A	5.8	14.4	19.2	22.3	30.3	35.3	35.4	36.0
B	5.0	11.1	14.6	20.8	25.6	29.4	31.2	33.1
C	2.7	6.6	8.6	12.0	15.7	18.6	22.0	24.0
D	2.4	2.7	5.4	6.5	8.7	9.0	11.2	13.3
E	1.2	1.6	1.6	2.8	4.0	4.0	5.0	6.4
F	—	0.3	0.6	0.8	0.8	0.6	0.3	0.3
SOAP MILLING								
A	7.8	13.6	17.6	28.9	35.1	39.2	42.4	44.2
B	4.0	10.4	14.7	22.0	26.9	32.8	34.0	36.1
C	2.2	7.1	8.7	13.6	16.5	19.4	22.4	24.0
D	2.1	4.0	7.1	8.8	10.1	12.3	12.5	13.2
E	1.3	2.1	3.0	4.0	5.9	5.1	7.8	7.8
F	—	-0.5	-0.5	-0.5	—	0.5	—	0.8
ACID MILLING								
A	14.5	23.3	27.8	33.7	36.8	42.0	44.7	47.1
B	3.9	14.5	18.5	23.0	25.4	35.2	40.0	44.6
C	3.2	10.8	15.2	17.0	17.6	22.0	25.0	27.6
D	2.0	5.3	6.3	7.5	7.5	7.8	7.8	7.8
E	0.8	1.8	2.5	3.0	2.8	4.0	4.8	5.1
F	-0.9	—	—	-0.9	—	0.9	—	—

* For composition of fabric, see Table II.

to soak in hot water until all the bulk has been developed. The fabric can then probably be safely scoured in a winch or even a light dolly. Alternatively, a brattice machine may be used for bulking.

MILLING

This operation is an important means of obtaining a soft handle and of making blended cloths more attractive. In both wool-Terylene and wool-acrylic blended fabrics the greater the percentage of man-made fibre in the fabric the less is the shrinkage (cf. Tables IV and V), under almost all conditions of milling.

TABLE V
Shrinkage of Wool-Courtelle Blended Fabrics*

Composition of Weft 64s Wool (%)	Courtelle† (%)	Width Shrinkage (%) after Milling for—			
		15 min.	30 min.	45 min.	60 min.
100	0	12.4	20.9	24.9	29.4
80	20	7.0	12.8	16.0	21.4
60	40	1.6	4.1	7.3	9.8
40	60	0.0	0.5	1.0	3.6
20	80	1.5	1.5	1.0	2.0
0	100	1.5	2.0	1.5	2.5

* Construction—

Warp: cotton 2/22s, 27 ends/in.

Weft: 12s Y.S.W., 67 picks/in.

Weave: 3/1 twill—weft reversible.

† 3 denier, 2½ in.

The presence of small amounts of Terylene, e.g. additions to increase the strength of a cloth, does not usually affect shrinkage significantly. If the acrylic fibres are plasticised by carrying out the milling at a comparatively high temperature, the inhibiting effect of the acrylic fibre seems to be reduced, so that blends, e.g. of Courtelle and wool, shrink considerably when milling is carried out in boiling water with mechanical agitation⁴.

Since wool-man-made fibre blended fabrics usually shrink more slowly than the corresponding all-wool cloths, the time of milling must be longer if the same shrinkage is required. There is often, therefore, some loss of wool, and flocking can become serious. During milling the wool tends to work to the surface, and consequently the handle of the fabric is often appreciably improved.

An alternative way of obtaining the high shrinkage characteristic of milling is to use high-bulk yarn, for while an ordinary yarn may shrink by 10% when soaked in water at 210°F., a corresponding high-bulk yarn will shrink by as much as 36%. To obtain the optimum shrinkage, relaxation should be carried out at 205–212°F.¹ and great care should be taken to avoid creasing during this stage of the finishing routine. Once full relaxation has been obtained, the cloth may then be washed or even lightly milled to produce the required cover.

REMOVAL OF WATER

All the conventional methods can be used. With acrylic blends suction slots are in many ways to be preferred, for centrifuges and squeeze rollers operating on fabric in rope form tend to crease the fabric. If centrifuging or squeezing is adopted, however, it is essential to ensure that the fabric is

cool. Overstretching in tentering and drying should be avoided, as this flattens the weft, and the dried cloth will have a lean handle. There is a tendency to overdry the blended cloth, because of the lower moisture content of the blended fabric. As would be expected, the greater the amount of Terylene in the blend the less is the amount of water adsorbed. The tenter may often, therefore, be operated at a lower temperature than usual, or may be run at somewhat higher speed.

Some finishers dry wool-Terylene cloths at as high a temperature as possible to set the cloth, but this can affect the handle adversely. It may, however, be necessary when Continental types of polyester fibres are present in the fabric, for some of these are not so efficiently heat-set as Terylene. They may therefore contract in a subsequent process of dyeing or finishing.

REMOVAL OF SURFACE FIBRE

Cropping is the most usual method employed, and wool-acrylic blended fabrics present no problems. Special care must, however, be taken in cropping wool-Terylene blended fabrics⁵. The machines must be maintained in good condition and reground frequently. The cutting parts of some of the newer cropping machines are made from new cutting steels chosen to ensure that they keep their edge even when employed to cut the tougher new fibres.

Good cropping is, perhaps, the simplest way of reducing the tendency of a cloth to "pill". Indeed, it is often the only one available to a finisher who has not access to singeing equipment. To minimise pilling the fabric should be cropped as closely as possible. If this is carried to excess, however, the handle of the cloth suffers, and consequently in all cases a compromise has to be made between leaving sufficient fibre on the cloth to obtain a good handle and removing surface fibre to minimise pilling. It is commonly believed that pills are formed by mechanical action on the fibrous fuzz on the surface of the cloth. With all-wool cloths the pills are subsequently easily detached, but with fabrics containing the stronger fibres the pills are detached only with difficulty. To minimise pilling, therefore, the initial fuzz formation should be prevented. Cropping does this, and brushing before cropping is a further help, but excessive brushing should be avoided, as it loosens the structure of the yarns and facilitates the subsequent production of fuzz.

Singeing is the most effective means of reducing pilling. To obtain the best results⁶—(i) the cloth should be cropped before it is singed, (ii) it should be washed after being singed to remove degraded material, and (iii) it should be brushed and cropped after scouring to remove the loose fibre which has been lifted during that process. Gas singes are usually preferred to plate singes, as the handle of the finished cloth is probably better. Goods to be dyed cannot, of course, be singed, as the small globules of melted fibre absorb dye preferentially, giving the cloth a speckled appearance.

On some cloths a light milling can delay the onset of pilling. Some wool fibres are brought to the

surface of the cloth, but do not form objectionable pills. As soon as they are worn off, however, the cloth begins to pill. A new modified high-speed brushing and shrinking technique developed by du Pont is also claimed to be effective. This involves special brushing by means of a cylinder covered with fancy wire so as to produce local flattening and distortion of protruding fibres along their length. To complete the process, the distorted fibres are caused to shrink, e.g. by being heated to a high temperature for a short time, and this locks the disfigured fibres within the fabric. This ingenious sequence of operations indicates an important development in finishing fabrics containing Dacron, and may be the forerunner of other new and perhaps better techniques.

Wool-acrylic blended fabrics do not usually pill, but some all-Orlon fabrics do. It is claimed, however, that treatment with a solution containing 5 g. of soap per litre at 40°C. for 15 min. followed by drying in a current of air reduces this if the process is repeated six times. The effect is claimed to be due to a modification of the surface characteristics of the fibre.

FLATTENING

The final process necessary to obtain a flat and smooth finish on the cloth should be chosen with

great care. In general, dry blowing using a cotton wrapper is the preferred method, as rotary and even flat hydraulic pressing give the fabric an unattractive shine. Creases should be avoided at all costs, for they tend to be permanently fixed.

RAISING

Wool-Terylene blended cloths are not often raised, as the process tends to initiate pilling. If it is done, the wool is raised preferentially, as shown by the results given in Table VI, which relate to the raising of several wool-Terylene blended fabrics. The addition of cationic softeners facilitates raising.

TABLE VI
Raising of Wool-Terylene Blended Fabrics

Wool in Unraised Fabric (%)	Wool in Pile on Raised Fabric (%)
80	84
60	68
40	48
20	30

Wool-acrylic blended fabrics respond well to the process, and the resulting cloths are soft and attractive. Excellent velour and blanket styles can be obtained. Again, treatment of the cloth with

TABLE VII
Changes in Dimensions during Finishing

Fabric	Shrinkage in Width (%)* after—							
	Crabbing	Scouring	Tentering	Steaming	Cutting	Blowing	Steaming	Pressing
A	8.2	10.0	5.4	8.6	8.6	9.5	9.5	9.5
B	7.6	8.9	4.6	7.1	7.1	7.5	8.0	8.0
C	6.2	6.8	3.6	6.8	6.8	6.5	7.0	6.8
D	4.9	6.1	2.0	2.9	2.9	3.3	3.3	3.5
E	4.0	4.4	2.0	2.2	2.2	2.0	1.8	2.0
F	2.1	1.8	1.0	0.6	0.6	0.5	0.6	0.5

* Calculated on grey dimensions

TABLE VIII
Changes in Dimensions during Finishing

Fabric	Shrinkage in Length (%)* after—							
	Crabbing	Scouring	Tentering	Brushing and Steaming	Cutting	Blowing	Steaming	Pressing
A	-4.3	2.7	2.0	3.0	3.0	4.6	4.0	3.1
B	-2.0	1.6	0.8	1.5	1.5	2.7	3.0	2.8
C	-0.7	2.0	1.0	0.9	0.9	1.1	1.0	0.8
D	-5.3	-2.1	-3.0	-3.0	-3.0	-2.5	-2.1	-2.3
E	-4.4	-3.9	-4.0	-3.8	-3.8	-3.9	-3.9	-3.9
F	-4.6	-5.3	-5.0	-5.5	-5.5	-5.0	-5.0	-5.2

* Calculated on grey dimensions

TABLE IX
Physical Properties of Wool-Terylene Blended Fabrics

Fabric	Bending Length, cm.*		Resistance to Abrasion†	Bursting Strength (lb./sq.in.)	Resistance to Creasing‡
	Warppways	Weftways			
A	1.73	1.60	2580	131	77
B	1.78	1.64	3370	159	76
C	1.90	1.75	3980	236	76
D	1.94	1.80	5630	292	77
E	2.16	2.03	6380	339	77
F	2.37	2.22	7610	373	73

* A low bending length indicates a soft cloth of good draping characteristics.

† No. of revolutions to wear a hole.

‡ As measured on the Shirley Institute Creasometer.

cationic softening agents before raising is useful. After being scoured, the fabric should be tented, not only to dry the cloth but also to minimise the width shrinkage which takes place during raising. If a double-action machine is used, raising is first started with medium pile and counterpile action and finished with more counterpile action than pile. A good felting or "tucking-in" effect can be obtained by running the fully raised cloth on a Tomlinson single-action machine with the P.I.V. gear box set at zero.

FINISHING ROUTINES

The basic sequence for blended suitings or dress goods would appear to be—

Preset by dry blowing or relaxing if necessary; scour (the cloth can be milled to soften the handle); pass over suction slot and tenter with overfeed; brush and crop; singe*; wash*; brush and crop*; dry-blow. The processes marked with an asterisk should be omitted when processing acrylic blends.

Routines for finishing raised fabrics containing acrylics are illustrated by the following⁶—

Blankets

The softness and crispness of the finished product is, of course, greatly affected by the denier of the fibres used and is determined by the composition of the blend. Warp and weft can be made from regular yarns, or high-bulk material can be used as weft. Blends containing fibres of different lengths and deniers are recommended to yield the best results. The finishing routine is as follows—scour and apply lubricant (cationic); tenter; raise.

Duvetyns

These cloths can be made from blends of wool and Orlon of mixed deniers. High-bulk yarns are

used in which the coarser fibres constitute the high-shrink part of the blend. These fibres thus form the core of the bulked yarn, while the fine fibres remain on the outside and form the pile on the finished cloth. The routine is—relax; scour; mill lightly if necessary; pass over suction slot; raise wet on teazles; tenter; brush and crop; decatise with a soft wrapper.

CHANGES IN DIMENSIONS DURING FINISHING

As would be expected, the composition of a blended fabric determines the changes in dimensions which take place during finishing. This is illustrated by Tables VII and VIII, which refer to the finishing of a series of cloths containing various amounts of wool and Terylene⁷. Dimensional changes during the finishing of fabrics containing Courtelele are given by Edwards and Sneyd⁴.

The properties of the finished cloths also reflect the different compositions, as is evident from the data given in Table IX.

DEPARTMENT OF TEXTILE INDUSTRIES
THE UNIVERSITY
LEEDS 2

(MS. received 9th February 1959)

References

- ¹ DuP, "Dyeing and Finishing of Orlon" (*du Pont Bulletin* OR-8, 1957).
- ² Hartley, R. S., and Elsworth, F. F., *J. Textile Inst.*, **49**, p. 554 (1958).
- ³ Whewell, C. S., *ibid.*, **47**, p. 851 (1956).
- ⁴ Edwards, H. D., and Sneyd, H., *ibid.*, **49**, p. 394 (1958).
- ⁵ Mims, N. M., *J.S.D.C.*, **72**, 426 (1956).
- ⁶ Barrett, K. T., *Proc. 6th Canadian Textile Seminar*, p. 96 (1958).
- ⁷ Hollings, G. I., *Diploma Thesis* (University of Leeds, 1955).

The Uses of Acrylic Fibre Blends with reference to Colour Fastness*

H. D. EDWARDS and N. JACKSON

One-day Conference of the West Riding Section held at the Bradford Institute of Technology on 7th November 1958, Dr. R. L. Elliott in the chair

The main properties of acrylic fibres are medium strength with low strength-loss upon wetting, low water-imbibition, high resistance to organic solvents, good dyeing properties, warm handle, and ability to recover from a high-temperature stretch; this last property is utilised in the production of high-bulk yarns, characterised by low density, soft full handle, and low weight. An outstanding property is the stability to repeated washing of acrylic blend fabrics.

End-uses for acrylic fibre fabrics and blend fabrics are numerous. Typical of these are baby clothes, which have good washing stability and are warm and yet light in weight. Jersey dresses and suits, which have particular advantages of smooth handle and excellent drape without stretching or

sagging, may be washed repeatedly without shrinkage, felting, or loss of appearance. Blends of 55% Courtelele plus 45% wool are used in women's and men's suitings having excellent smartness, stability, durable creases, and no bagging. Blends of 65% Courtelele plus 35% wool are used in fine light-weight tropical suiting with advantages over all-wool fabrics of equivalent weight. Women's knitted wear is produced in bright clean colours utilising high-bulk all-acrylic fibre. The excellent washability of acrylic fibres is shown to advantage in women's knitted underwear. Courtelele in blends with cotton or Fibro is used in women's dresses and in men's sports shirts.

In view of the stabilising effect of acrylic fibres on fabric structure, its preservation of the original

* Summary of lecture largely concerned with discussion around samples and results of fastness testing.

particular fabrics and end-uses, which were illustrated by actual

finished appearance, and their greater life, it is essential that their colour fastness be adequate for the end-use required.

All-Courtelle materials are dyed with disperse dyes for pale and medium depths and basic dyes for deep colours. The acrylic fibre requires low washing temperatures and moderate steaming conditions; hence the wet fastness of disperse dyes is generally satisfactory. Basic dyes have good build-up and wet-fastness properties, but the choice of dyes may be particularly important; e.g. certain combinations of yellow and blue dyes have poor off-tone light fastness, and certain dyes such as the triphenylmethane greens have poor sublimation fastness on Courtelle.

In blends with wool, Courtelle is used in woven outerwear, and washability is a desirable feature of the blend. Washing conditions will not be drastic, and milling-type dyes on the wool with basic dyes on the Courtelle are adequate. Very good light fastness is required and may be obtained in most colours, although browns may require careful dye selection. Adequate steaming fastness can be obtained on Courtelle, but not all wool dyes are sufficiently fast, particularly as wool itself goes yellow.

Blends with cellulosic fibres, e.g. shirting, may be exposed to far more drastic washing conditions, and it is essential that adequate fastness be obtained. In pale colours one-bath dyeing with disperse and direct dyes gives sufficient fastness. Certain factors must be borne in mind in heavy depths. Firstly, where the cellulosic fibre is the minor component, there is poor exhaustion of direct dyes from baths of effectively long liquor ratio. Secondly, once the cellulosic component has been dyed, it is necessary that the fastness be adequate. Fastness is improved by aftertreatments, but where basic dyes have been applied to the Courtelle it is desirable to keep the temperature below 65°C., because copper is likely to enter the Courtelle fibre and produce a change in colour.

Vat dyes would be satisfactory for the cellulosic component, but the problem here is one of expense, since after dyeing the acrylic component of the blend, transfer from the winch to the padding jig would be entailed. It is hoped to develop a more rational procedure for this type of dyeing.

Package dyeing, however, is used to dye cellulosic blend yarns. Application of basic dyes at the boil may be followed by vatting under

normal conditions, and because the yarn is firmly held there is no mechanical action. The vatting process has no deleterious effect on the Courtelle component. Wool blends may be satisfactorily dyed in package by one-bath methods using basic and milling dyes, because temperature control can be exercised.

Printing techniques have considerable scope in the dyeing of acrylic fibres. With 100% fibre it is possible to obtain excellent all-round fastness by mélange printing with disperse or basic dyes on tow or top. Printing with vat dyes on 100% Courtelle fabric gives excellent fastness, the light fastness being higher in many cases than on cotton. It is anticipated that considerable use will be made of basic dyes in view of the brilliance of colour and the excellent fastness obtainable.

One of the great difficulties of the early stages of any new development is that of predicting the precise end-use in which a fabric will be successful: one could go through an entire range of fabrics and fabric types and show a large amount of interchangeability. It is for this reason that we try to give the maximum fastness available, although this may entail additional cost which finally may not be essential. When particular end-uses are established, however, it is possible to dye the fibre to the particular requirement at reduced cost. It is in the interests of the fibre producer, the manufacturer, and the dyer that the initial trials and evaluations meet with success.

The dyer can give help in promoting new fibres and new developments in the trade. There are many cases in which new dyeing and finishing techniques make available particular colours, particular ways of doing things, which can be actively promoted by the dyers as a deliberate policy to encourage trade. Many fabrics produced initially by Continental finishers, and copied here when success has been achieved, could have been produced in this country. Dyers can assist manufacturers, who in turn can co-operate with dyers to see how any particular fabric can be exploited to give maximum attractiveness. We have in the acrylic field enormous potentialities in fabric finishing, which can be fully exploited only by such collaboration.

RESEARCH LABORATORY
COURTAULDS LTD.
DROYLSDEN
MANCHESTER

(MS. received 22nd May 1959)

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents

Hydrogen Peroxide Bleaching

The interesting paper by Chesner and Woodford¹, drawing attention to the fact that the water-soluble impurities found in grey cotton act as stabilisers in the hydrogen peroxide bleaching bath, will have prompted many to make further trials in this direction, for bleachers are always anxious to reduce their costs.

With a typical cotton-bleaching formula¹ the decomposition of hydrogen peroxide is over 90% in 2 hr. in the absence of cloth, but in the presence of grey cotton cloth or where an aqueous extract from grey cotton has been added to stabilise the bath the decomposition is reduced to approx. 50%.

The problem arises, however, as to how the best use can be made of the peroxide remaining in the

bath at the end of the bleaching process. If one strengthens up and re-uses the bath, the natural impurities accumulate, causing soiling of the bath and a loss of brightness of the bleached fabric, and at the same time the consumption of hydrogen peroxide rises to about 70%. It appears, therefore, that it would be preferable to give a preliminary scour to remove "grey" impurities and rely on the addition of a specific stabiliser of known composition. Reference to a commercial product of this type has already been made².

In the course of an investigation being carried out here it has been found that by the use of a fine suspension of magnesium silicate or of magnesium hydroxide, or by the use of soluble magnesium complexes of sequestering agents, it is possible to prepare bleach baths of very high stability in which efficient bleaches can be obtained with consumptions of hydrogen peroxide as low as 10-15%, i.e. approximately one-third of that used in the normal method. It is interesting to record that in such a bath the use of grey cloth or an aqueous extract from grey cotton shows no stabilising effect, but rather the reverse. It appears, therefore, that the stabilising effect of the grey cotton impurities is operative only in a bath which is otherwise somewhat unstable.

The use of magnesium silicate as a stabiliser is by no means novel. It has frequently been suggested that the small amounts of magnesium and calcium present in hard water or as impurities in grey cotton assist in stabilising the bleach bath by the formation of the corresponding silicates which are in fact the actual stabilising agents, and it has been recommended that, when soft water is employed, an addition of 1½-3 oz. of magnesium sulphate per 100 gal. can be made with advantage.

Our trials indicate that the most economical bleach is obtained in the region of 80°C. and in the pH range 9.5-10.2 in the presence of 0.5-1.0% magnesium, either as a suspension or as a complex. This amount of magnesium is 50-100 times the quantity previously recommended. Calcium, barium, and aluminium complexes may also prove useful. Of the dispersing agents used to maintain the insoluble magnesium compounds in a fine state of suspension, the nitrogen-containing products marketed as lime-soap-dispersing agents such as sodium *N*-oleoyl-*p*-anisidinesulphonate and sodium *N*-oleoyltaurate appear to be more effective than the normal anion-active or non-ionic surface-active agents. Despite the use of such products, some deposition on the fabric takes place in the case of magnesium silicate, as is shown by the increase in ash content. In the case of magnesium hydroxide suspensions any deposition can be removed by souring. Alternatively, a bath completely in solution at a pH of approx. 10.2 can be stabilised by means of magnesium sulphate, ethylenediamine-tetra-acetic acid, and caustic soda.

Fig. 1 gives a comparison between the method in which grey cotton impurities are used as the stabilising agent (broken line) and that in which dispersed magnesium silicate is used (continuous line). If a comparison is made of the rate of fall of hydrogen peroxide concentration and the rise in

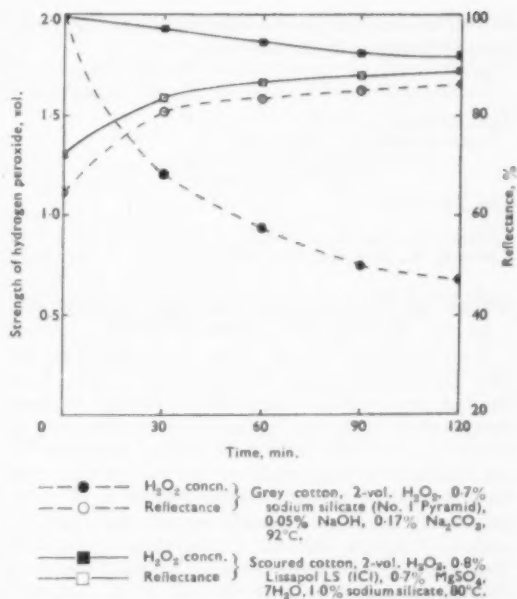


FIG. 1—Comparison of Bleaching Methods

reflectance during bleaching in the two cases, the considerable economy which is possible in hydrogen peroxide consumption can easily be seen. Despite this economy, the quality of bleach obtained appears in every way to be equal to that obtained by the normal method.

Sequestering agents are normally employed to render less active by chelation such harmful impurities as copper and iron. It seems surprising, therefore, that magnesium should be able to exert its stabilising influence when presumably it is present as a chelate compound. It has been found that, if scouring is carried out in a stainless-steel winch machine fitted with a brass or copper alloy steam pipe, a trace of copper is picked up by the fabric and is sufficient to have a marked effect during subsequent bleaching in peroxide: apart from a significant rise in fluidity of the bleached cotton, there is a considerable increase in hydrogen peroxide decomposition.

The harmful effect of copper is not entirely eliminated by the use of chelating agents, and it appears wiser to avoid any such contamination rather than to rely on a margin of safety being conferred by addition of protein products.

Bleaching is normally carried out in stainless-steel apparatus, but trials carried out in the presence of various metals and alloys show that, while many metals catalyse the decomposition of peroxide, others, of which aluminium is an outstanding example, appear to exercise a stabilising effect. Preliminary trials in a household aluminium vessel show that bleaching can be carried out without any noticeable attack on the metal, and that the decomposition of hydrogen peroxide is decidedly less than when the bleach is carried out in a stainless-steel vessel. The use of aluminium for the storage and transport of hydrogen peroxide

is well known, but its use in actual bleaching plant does not appear to be common.

W. L. LEAD
A. S. RAMADAN

DYEING LABORATORY
DEPARTMENT OF TEXTILES
NOTTINGHAM AND DISTRICT
TECHNICAL COLLEGE

25th April 1959

¹ Chesner, L., and Woodford, G. C., *J.S.D.C.*, **74**, 531 (1958).

² Weible, K., *ibid.*, **74**, 860 (1958).

Effect of Temperature on the Felting and Dyeing Properties of Wool

Previous work on the effect of temperature on the felting shrinkage of wool has either been limited to a narrow temperature range¹ or large temperature intervals² or has been concerned with shrinkage in cloth milling or felting machines^{3,4}. In milling or felting machines the wool is subjected to mechanical action in the presence of comparatively small volumes of soap or acid solutions, and it is rather difficult to maintain a constant temperature. This note is a preliminary report of felting experiments carried out in a domestic washing machine, where the ratio of solution to wool is large and a constant temperature can be maintained.

The machine used was a Whirldry washing machine manufactured by the Easy Washing Machine Corp., Syracuse N.Y., U.S.A. It consists of an inner perforated cage, with metal vanes about 2 in. high at the bottom, which rotates about a central column. The rotational movement is an oscillation about the vertical axis through an angle of about 120°. The machine was heated externally by gas, and temperatures were maintained within $\pm 0.5^\circ\text{C}$. except above 80°C ., where the variation was within $\pm 1.0^\circ\text{C}$.

Statistical analysis of the results obtained with this machine shows that the standard error on shrinkage results of approx. 20% was below 0.30 and averaged 0.20. This means that a difference of more than twice this amount (i.e. 0.4–0.6%) between two mean results is likely to be significant⁵.

Preliminary results over the temperature range 20–70°C. with irregular temperature intervals showed the presence of maxima at 45° and 60°C. in the temperature-shrinkage curve. Statistical analysis of the results obtained shows that the difference in shrinkage between the pairs of temperatures on each side of the maxima is significant at the level $P = 0.001$.

The results obtained in these experiments were, however, sufficiently interesting to justify more detailed study. The results of a typical experiment are shown in Fig. 1.

The maxima at 45° and 60°C. are again clearly evident, and there is therefore no doubt as to their reality. There are, however, two additional breaks in the curve, at about 20° and 30°C., and further experiments with temperature intervals of approx. 3°C. showed the presence of maxima in the shrinkage-temperature curve at 22° and 33°C. In our experiments we have shown the maxima at 45° and 60°C. to occur for shrinkage experiments

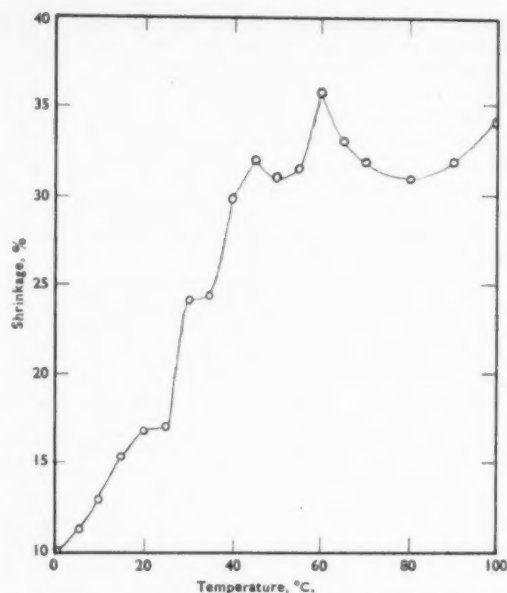


FIG. 1.—Effect of Temperature on the Shrinkage of Wool at pH 9.2

carried out over the pH range 1.2–11.5, and the maxima at 22° and 33°C. to be observable over the pH range 3.0–12.3.

Concurrently with this work the exhaustion of some acid dyes on wool had been followed. The exhaustion-temperature curves showed that a step or break at 60°C. was common to a number of dyes. In view of the maxima obtained on the shrinkage-temperature curves, it seemed desirable to investigate in more detail the effect of temperature on the adsorption of the dyes by wool.

The amounts of dye adsorbed when wool is shaken for a given time at constant temperatures with a solution of Naphthalene Scarlet 4R (C.I. Acid Red 18) are shown in Fig. 2. The time of shaking was 3 min. for temperatures up to

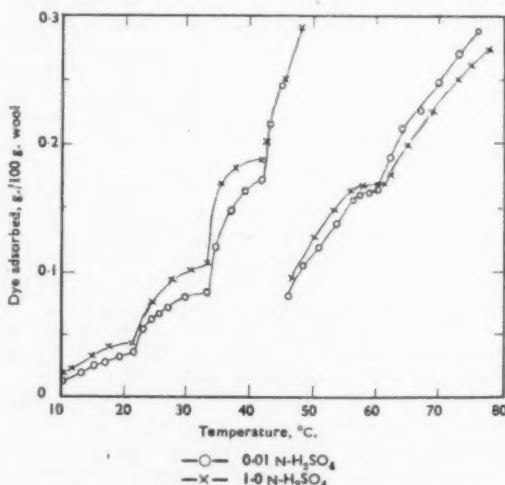


FIG. 2.—Effect of Acid Concentration on the Adsorption of Naphthalene Scarlet 4R by Wool

50°C., and 30 sec. for higher temperatures. This shows clearly the presence of four "critical" temperatures—22°, 33°, 42°, and 60°C. These temperatures are very similar to those at which the shrinkage-temperature curve exhibits maxima, and it seems probable that the changes in the wool responsible for these unusual temperature effects are the same for both shrinkage and dyeing experiments.

The discontinuities in the dye adsorption and shrinkage curves are most probably due to the breakdown of some of the linkages present in the wool molecule (e.g. disulphide bonds, salt-linkages, hydrogen bonds, etc.). The discontinuities have been shown to be present at pH values where the disulphide bond is stable and the salt-linkages are completely broken, which suggests that the changes responsible for the discontinuities are the breakdown of hydrogen bonds.

Strong solutions of formic acid are believed to cause the breakdown of hydrogen bonds in fibrous proteins, particularly those responsible for the configuration of the main polypeptide chain⁶. The adsorption of dyes from 80% formic acid solution was found to be extremely rapid even at low temperatures. The amount of dye adsorbed from a given solution in formic acid reached a limiting value within 1–2 min. at 10°C., and no further dye was adsorbed as the temperature was raised to 70°C. or higher. Although dye adsorption was very rapid, the levelness of the dyeing was excellent, which agrees with the recently published findings of Harrap⁷. The results obtained in formic acid solution support the view that the discontinuous adsorption of dyes by wool and other fibrous proteins is due to the progressive breakdown of hydrogen bonds.

We have also studied the effect of temperature on the shrinkage properties of wool in strong (10 M.) urea solution. The results obtained indicate that the maxima in the shrinkage-temperature curve are no longer present. This provides further support for the view that these maxima also are due to the progressive breakdown of hydrogen bonds.

We hope to publish a fuller account of this work in due course.

We wish to thank Professors H. V. A. Briscoe and C. S. Whewell for their helpful suggestions during the course of this work and the Directors of Wolsey Ltd. for permission to publish this letter.

D. R. GRAHAM
K. W. STATHAM

ABBEY MEADOW MILLS
LEICESTER

24th April 1959

¹ Speakman, J. B., Stott, E., and Chang, H., *J. Textile Inst.*, **24**, T 273 (1933).

² Mercer, E. H., *J. Council Sci. Ind. Research*, **15**, 285 (1942).

³ Schofield, J., *J. Textile Inst.*, **29**, T 246 (1938).

⁴ Speakman, J. B., Menkart, J., and Liu, W. T., *ibid.*, **35**, T 41 (1944).

⁵ Fisher, R. A., *Statistical Methods for Research Workers* (London: Oliver & Boyd, 1941), p. 112.

⁶ Lloyd, D. J., and Garrod, M., *Trans. Faraday Soc.*, **44**, 441 (1948).

⁷ Harrap, B. S., *J.S.D.C.*, **75**, 106 (Feb. 1959).

Definition of "Finish"

I feel that the tentative definition of *finish* published recently in the *Journal*¹ should be most carefully examined before it is accepted as a final definition. It seems to me that it is essentially tautological. To define *finish* accurately is a complex matter and cannot normally be done in a few words. In an attempt to make the definition brief, it has been made so woolly that its only virtue is that it would be literally true in every circumstance, but in framing it in this way it becomes entirely uninformative. No-one ignorant of the term could gain any reasonable idea of the actual thing from this definition, but more important is the fact that it is quite useless as an authoritative statement against which special or unusual examples might be judged.

As implied at the beginning of the letter, the task of devising a completely satisfactory definition of this term is very considerable indeed, but in my view this difficulty has merely been evaded.

H. A. TURNER

DEPARTMENT OF TEXTILE CHEMISTRY
MANCHESTER COLLEGE OF SCIENCE AND TECHNOLOGY

14th May 1959

J.S.D.C., **75**, 154 (March 1959).

Notes

Meetings of Council and Committees

June

- Council—No meeting
- Finance and General Purposes—30th
- Publications—16th
- Terms and Definitions—12th
- International Federation 1959 Congress—
 - Social Subcommittee and Ladies' Subcommittee—19th
- Burnt-gas Fumes Fastness Subcommittee—2nd
- Colour Index Editorial Board—5th
- Review of Textile Progress—8th
- West of England and South Wales Section Inauguration—26th.

Date of Publication

We regret that, owing to the dispute in the printing industry, it has not been possible to publish this issue before September 1959.

Fred Scholefield, M.B.E.

Members of the Society will wish to congratulate Mr. F. Scholefield, M.Sc., F.R.I.C., F.T.I., F.S.D.C., on the award of the M.B.E., announced in the Birthday Honours List. Mr. Scholefield is Technical Adviser on Dyestuffs to the Association of British Chemical Manufacturers, and was formerly Head of the Department of Textile Chemistry at

the Manchester College of Technology. He is an Honorary Member of the Society, was President during 1950-1952, and over many years took a leading part in its work, receiving the Gold Medal in 1947 for "exceptional services to the Society in the advancement of Tinctorial Technology both in theory and practice".

C. R. Talbot, M.B.E.

Members of the Society will wish to congratulate Mr. C. R. Talbot on the award of the M.B.E., announced in the Birthday Honours List. Mr. Talbot, a member of the Midlands Section of the Society, is dyehouse manager with Messrs. William Hollins Ltd. of Nottingham, and also Chief Civil Defence Warden of Nottingham.

Colour Index

Additions and Amendments

It has been decided that in future these lists will be issued as separate supplements to the *Journal*. List No. 3 formed an integral part of the April 1959 issue, and list No. 4 is enclosed with the present (July) issue.

Members travelling Overseas

The International Relations Committee invites members of the Society who intend to take part in congresses abroad to inform the General Secretary, so that this information can be passed on to the appropriate overseas society.

The Committee also invites members who intend travelling abroad for other reasons to let the General Secretary have details of the regions they will be visiting with dates. This might facilitate meetings with overseas members and others in the area for the exchange of goodwill greetings.

Fastness Tests Co-ordinating Committee

Dr. P. W. Cunliffe has relinquished the chairmanship after close on nine years in office, but remains a member of the Committee. Mr. K. McLaren now becomes chairman, and his place as Honorary Secretary of the Committee is taken by Miss Esmée Smith, who is also Honorary Secretary of the West Riding Section of the Society.

Annual Meeting of Section Officers

The Annual Meeting of Chairmen and Honorary Secretaries of Sections was held at the Grand Hotel, Leicester, on Friday, 10th April 1959, under the chairmanship of Mr. L. M. Wood (Honorary Secretary of the Society). Among the topics discussed were outstanding subscriptions, the banking accounts of Sections, methods of increasing the membership of the Society, the use of projectors and tape recording machines, and lecture titles for the 1959-1960 session.

Reports of the Sections for 1958-1959

HUDDERSFIELD SECTION

During this session eight lectures have been held, the average attendance being 56, and the highest

75. As usual, we held joint lectures with the Royal Institute of Chemistry and the Huddersfield Textile Society, both of which were very well attended. The joint meeting with the R.I.C. was outstanding, inasmuch as it was by Herr K. Roessler of B.A.S.F., the first lecturer from a German dyeworks to visit the Huddersfield Section in the postwar period. The joint meeting with the Huddersfield Textile Society was the occasion of a valued visit by Professor J. B. Speakman, while his subject was right up to the minute as usual.

Last year we were invited by the Halifax Textile Society to join them at the lecture by Mr. Eric Lupton of Fletcher Brothers, the subject being *Vigoureux Printing*. Our Chairman, Mr. H. Boothroyd, suggested that we might make this a yearly event, and the Halifax people seemed very pleased with the idea.

On July 4th the Section was privileged to visit the U.K. Atomic Energy Station at Calder Hall, Cumberland. Transport was arranged amongst our members, and meals were provided on both journeys. This visit was enjoyed by all who took part.

The Annual Dinner of the Section was held at the Princess Café, Huddersfield, when 113 members and guests had a very enjoyable evening.

As a result of representation made to Council, it was decided to hold a referendum of Yorkshire members. Out of a total of just over 600, 180 people opted for the Huddersfield Section, which is very gratifying.

During the Session, two of our long-serving Committee members, Mr. D. Hanson and Mr. J. A. Wallwork, retired and left the district, and the members of the Section wish them long life and good health in their new surroundings. To fill the vacancies Mr. H. Sellers and Mr. E. Thornton were elected.

The officers and members of the Section were delighted to learn that Council had announced the award of a Bar to the Silver Medal held by the Honorary Secretary of the Section as further recognition of his services. The presentation was made in Leicester on April 10th.

The film show on 21st April 1959 promises to be quite unusual, inasmuch as it deals with defective colour vision.

The proposed visit to a modern dyehouse has had to be postponed, but will probably take place next September or October to open the new session.

HORACE TURNER

*Honorary Secretary
Huddersfield Section*

LONDON SECTION

The session has been a very active one for the London Section, the programme consisting of 13 meetings and social events.

Six lecture meetings have been held in the rooms of the Royal Society, and in addition joint meetings in London have been held with the Textile Institute, the Oil and Colour Chemists' Association, and the Guild of Dyers and Cleaners. A meeting has again been held in Luton and this received excellent support from local members.

The lectures in London covered a wide range of subjects, including such matters as colour photography and the dyeing and colouring of furs and plastics in addition to textile subjects.

The highlight of the session was the investiture of the Chairman's badge by the President of the Society. The badge, commissioned by members of the Section at their expense for the use of the Chairman, will enhance the proceedings of the Section for many years to come.

The Sixth London Lecture was given by Mr. A. Lucas, Chief Restorer to the National Gallery, on the subject *Colour in Art*. This lecture was of the highest standard and added to the reputation of this series. The Section was pleased to have the company of the President and Mrs. Boulton on this occasion.

Social events included the Annual Dinner and Dance, and also a Dinner after the London Lecture, both of which were attended by record numbers of members and guests. The session was concluded by the Annual General Meeting and Dinner.

The membership of the Section continues to increase gradually and now stands at 228.

The Section expresses appreciation to its Chairman, Dr. T. H. Morton, who has served it well during his two-year term of office, now completed.

H. W. TAYLOR
*Honorary Secretary
London Section*

MANCHESTER SECTION

Seven meetings of the Section have been held in Manchester this session and one joint meeting with the North Lancashire Section of the Royal Institute of Chemistry in Blackburn. The attendance at these meetings has been of the order of 70 members, with a particularly good response to the Ladies' Evening meeting and the Symposium on Reactive Dyes.

The Section was honoured to have the opportunity of staging in Manchester the Symposium to commemorate the discovery of the diazo reaction by Peter Griess.

The Junior Branch continues to flourish, although a slight decrease in attendance from that in the previous session has been observed.

Section meetings have again been held at the Textile Institute, and we are grateful to the Council of the Institute for the use of the lecture theatre. We are obliged also to the authorities of the College of Science and Technology for accommodation for the One-day Symposia, the Ladies' Evening, Junior Branch, and Committee Meetings.

The Annual Dinner and Dance was again held at the Grand Hotel, Manchester, on Saturday, 31st January 1959. This function was, as in previous years, an unqualified success, and attracted 263 members and guests.

The Knecht Memorial Prize for 1958-1959 has been awarded to Mr. T. A. Nutton, a member of the Junior Branch Committee, for his work in a Part-time Evening Course in Bleaching, Dyeing, and Finishing at the Manchester College of Science and Technology.

Four meetings of the Section Committee have been held during the past session, and the members wish to record their sincere appreciation of the services of the retiring Chairman, Mr. J. W. Reidy. The sincere thanks of the Committee are due also to the retiring members—Mr. E. E. Bowker, Mr. F. W. Bradley, Mr. W. R. Leigh, Dr. W. Shaw, and Dr. H. A. Thomas—for their valuable services during their period of office.

Membership of the Section has increased by 30 during the past session, and now totals 633 Ordinary and 25 Junior Members.

It is with regret that we record the death of the following members of the Section—H. Ashworth, F. L. Barrett (Fellow), A. Butterworth, D. E. Doran, and F. H. Pollard.

K. MELDRUM
*Honorary Secretary
Manchester Section*

MIDLANDS SECTION

During the session under review, 10 lecture meetings were held (3 at Loughborough, 2 at Leicester, and 2 at Nottingham, 1 of which was a joint meeting with the Nottingham Textile Society. Joint meetings were held also at Coventry with the Coventry Textile Society, when we were privileged to receive a lecture from our President, at Derby in conjunction with the British Association of Chemists, and also at Kidderminster with the Kidderminster Section of the Textile Institute). The range of subjects selected received commendation at the Annual Meeting of the Section, and the support of meetings well bore this out. The average attendance (for the session) was almost 100 and on three occasions more than 140 members and visitors were present. The Ladies' Evening at Leicester in October and the Annual Dinner in March at Nottingham both received record support from Section members. The well known "Midlands spirit" pervaded both functions, and we were very gratified at the support received from the officers of the Society: in fact, at the Annual Dinner all the officers of the Society graced our top table. This support is very much appreciated by the members of the Section and the Section officers, and gives us great encouragement.

The increase in Section membership this year was again only small (10). There were several transfers to other Sections, and we have to record the death of Mr. Whitwam and Mr. E. M. Walker.

Mr. Alan Cluley has now taken over the position of Chairman of the Section from Mr. A. W. Carpenter. In welcoming a new Chairman we must indeed express regret at seeing Alf Carpenter pass from the Chair of the Section to become the current Vice-chairman. His period as the Secretary and Chairman of the Midlands Section was notable and his work has been recognised by the presentation this year of a Bar to his Silver Medal. No man has given more to the work of the Society nor seen his work so well rewarded. The present wellbeing and atmosphere of the Midlands Section are largely due to his presence and work. The attendance of over 60 for the Annual General Meeting of the Section speaks well for the interest of members in its

working. Messrs. A. P. Kershaw, D. B. McPherson, J. C. Hawley, and B. B. Brewer were re-elected to the Section Committee, and in accordance with the new byelaws of the Section Mr. R. Greenlees was elected the first Section Treasurer.

The officers of the Section extend their thanks to all the members of the Committee, whose enthusiastic co-operation has made the functioning of the Section so smooth.

In addition, members of the Section have played their part in the general running of the Society: Messrs. C. A. Mills and W. L. Langton retired from Council this year, and Mr. W. Penn has continued his service as Vice-president. Midlands Section members have played their part on the various committees, having a total of no fewer than 25 representations.

The big event of the session, so far as the Midlands Section was concerned, was the Summer School at Nottingham, which was a function of the Society and received considerable support from the Section members and officers, who took their place on the organising committee and materially assisted towards the success of this venture.

The announcement at the Society's Annual General Meeting of the nomination of Mr. F. M. Stevenson as President-elect of the Society has caused great pleasure to the Midlands Section. This is an honour which has only once before been given to a Midlands Section member, and we congratulate Mr. Stevenson upon his election.

J. RAYMENT

*Honorary Secretary
Midlands Section*

NORTHERN IRELAND SECTION

The outstanding feature of the session just ended was the very high standard of lectures. In all, we had seven lectures, one of which was shared with the local section of the Textile Institute, and it was agreed that the high practical value and all-round technical quality of these lectures made this one of our most successful sessions. It is pleasing to report a good attendance at all lectures; and also at all committee meetings, six of which were held during the session.

Our Annual Dinner Dance was held on 24th October 1958 at Woodbourne House Hotel. There was an attendance of 180 members and their friends.

At the Annual Dinner held on 18th March 1958 at Grosvenor Rooms, Belfast, we had the pleasure of welcoming our President, Mr. John Boulton; also Mr. J. Scott-Kyle, Chairman of the Irish Power Loom Manufacturers' Association; and Mr. J. W. Nicholls, General Secretary of the Society. We had a number of musical items at this function, which were enjoyed by our guests and members, who totalled 78.

Our Annual Golf Outing was held on 7th June 1958 at Portadown Golf Club. We had our usual good attendance of members and guests, and we were fortunate to have very good weather.

It was again our privilege to donate five guineas to the Belfast College of Technology to be used for

prizes for textile students at the discretion of Dr. J. K. Skelly.

Mr. W. J. Macnab relinquished the Chairmanship of this Section at the Annual General Meeting held on 10th March 1959. During his two-year term of office Mr. Macnab spared no effort in promoting the welfare of this Section, and we are most grateful to him for his capable handling of this important office.

We look forward to a further successful session under our new Chairman, Mr. W. Graham.

JAMES PORTER

*Honorary Secretary
Northern Ireland Section*

SCOTTISH SECTION

We have just concluded another enjoyable session, during the course of which 8 lecture meetings were held, 7 in Glasgow and 1 in Galashiels. As usual, a joint meeting was held with the local section of the Textile Institute. Average attendance at meetings was somewhat lower than during the past two or three years, but this was due, to a certain extent, to the very severe weather, particularly in the early part of 1959.

Sectional membership shows only a slight increase, as, although several new members were enrolled, we had a similar number of resignations, removals, etc.

The Annual Golf Outing was supported by a record number of competitors and was a very successful affair.

The Annual Essay Prize, to be competed for by members of the Junior Branch, was instituted during the session, the subject chosen being *Invention and the Dyeing Industry*. The prize was awarded to Mr. Ian Fleming for his essay entitled *Phthalocyanine Dyes*, and formal presentation of books to the value of three guineas was made at the Annual General Meeting of the Section.

In conclusion, appreciation must be expressed to our retiring Chairman, Mr. W. G. B. Grant, and all members of the Committee for their valuable assistance and support throughout the session.

F. ATTACK

*Honorary Secretary
Scottish Section*

WEST RIDING SECTION

Under the chairmanship of Mr. R. Heaton the Section has held 9 lecture meetings and a One-day Conference on *The Dyeing, Finishing, and End-uses of Acrylic Fibre Blends and Polyester Fibre Blends*. The subject-matter of the lectures was varied. Attendance at lectures was rather disappointing, the average being about 50. Attendance at the One-day Conference averaged 90 for the two sessions.

The prize money for the West Riding Junior Members Competition (1957-1958) for the Dyers' and Finishers' Association Prizes was awarded to Mr. Brian Bennett and Mr. W. R. Hermes Jr., both students of the Bradford Institute of Technology. The prizes for the 1958-1959 Competition are to be presented at our Annual General Meeting. This year it took the form of an essay based on subjects

selected from A.S.D.C. examination papers; the entry was better, but still not as good as the Committee would like.

The Section Committee has met on five occasions.

ESMÉE SMITH

*Honorary Secretary
West Riding Section*

BRADFORD JUNIOR BRANCH

The nine meetings which the Branch has held this session at the Bradford Institute of Technology have all been well attended. A visit was made to Stevensons (Dyers) Ltd., Ambergate, Derbyshire, in October 1958.

The Diamond Jubilee of the Branch was celebrated by a dinner and dance held at the Victoria Hotel, Bradford, on Friday, 5th December 1958. Many senior and junior members of the Society attended, and the speakers were Dr. C. M. Whittaker, Mr. Fred Smith, Mr. L. S. Harding, and Mr. E. Wood. Everyone had an enjoyable evening, and a telegram was received from the President of the Society, Mr. J. Boulton.

KATHLEEN COPE

*Honorary Secretary
Bradford Junior Branch*

LEEDS JUNIOR BRANCH

A full programme of lectures and films was held by the Branch during the Session. Unfortunately, a proposed works visit had to be cancelled owing to the vagaries of the English weather.

Mrs. Joan M. Firth, who has been Honorary Secretary of the Branch for the past three years, resigned at the end of this session, and we thank her for the valuable service she gave during that time.

J. BUDDING

*Honorary Secretary
Leeds Junior Branch*

MANCHESTER JUNIOR BRANCH

Seven meetings were held during the session, with an average attendance of 34. A new and successful feature this year was a meeting devoted to three short papers by members of the Branch.

Our thanks are due to our lecturers—Messrs. B. Kramrisch, G. Cartridge, A. Gibb, and W. J. Watts and Professor R. W. Revans, and to Messrs. Brocklehurst-Whiston Ltd., Imperial Chemical Industries Ltd., and the American Embassy for the loan of films.

We congratulate one of our Committee members, Mr. T. A. Nutton, on winning the Knecht Memorial Prize.

Mr. H. A. Turner, our Chairman for the past two years, has been a most enthusiastic and inspiring leader, and we thank him for his support and congratulate him on his election as Chairman of the Manchester Section.

W. R. LEIGH

*Honorary Secretary
Manchester Junior Branch*

SCOTTISH JUNIOR BRANCH

Membership of the Branch is approximately the same as last year, with 40 members on the register.

We cannot boast of a large increase in members similar to that of last session. However, last year was the first full session of the Branch, and a larger influx than normal of new members in the first session of any society is always usual. Most students in the West of Scotland became members of the Branch last year, and new members in future will be related somewhat to the number of new students enrolling at the technical colleges.

Six scientific meetings were held this session, at which the average attendance was 35.

The Branch broke new ground in January by holding an extremely successful meeting in Balloch, in association with the local Guild of Dyers. A joint meeting was held in February with the Scottish Section of the Textile Institute.

The Scottish Section of the Society this year inaugurated an Annual Essay Competition, open to all members of the Branch. This year's competition has been won by Mr. I. Fleming for his essay, *Invention in the Dyeing Industry—the Phthalocyanine Dyes*. Mr. Fleming received his prize, in the form of books to the value of three guineas, at the Annual General Meeting of the Scottish Section. A copy of Mr. Fleming's essay and the examiners' remarks is in the possession of the Honorary Secretary of the Branch to enable any member who may wish to enter for future competitions to find out the standard required.

Branch activities this session were rounded off when members made two very successful works visits in April, one to the Seedhill Finishing Co. Ltd., Paisley, and the other to A. F. Stoddard & Co. Ltd., carpet manufacturers, Elderslie.

The Committee would like to express its sincere thanks to Mr. R. A. Peel, our first Branch Chairman, for his inspiration and encouragement in the starting years of the Scottish Junior Branch.

The Committee would like also to thank the Governors of the Technical College, Paisley, for granting the Branch the College Hall once a month for holding lectures and for the use of rooms for Committee Meetings.

R. McDONALD

*Honorary Secretary
Scottish Junior Branch*

Paisley Technical College

The college runs day release classes (one day and one evening per week) leading to the A.S.D.C. The curriculum is based on physics, chemistry, and mathematics during the first three years, after which fibre technology and dyeing are included, with colour physics and chemistry in the sixth year.

On satisfactory completion of the third year the student qualifies for an Ordinary National Certificate in Chemistry, after the fifth year for a Higher National Certificate in Applied Chemistry (Dyeing), and at the end of the sixth year he may be qualified to sit for the A.S.D.C. examination.

The college runs also evening classes leading to City and Guilds of London Institute examinations in dyeing.

OBITUARY NOTICE

Eric Berkeley Higgins

Dr. E. B. Higgins, Managing Director of Catomance Ltd., member of the Society for 54 years, died suddenly on 8th April 1959 at the age of 73 years. He received his technical training at the Manchester College of Technology under Professor E. Knecht, and later at Columbia University, New York.

Following a period spent with Joseph Crosfield Ltd. of Warrington, Dr. Higgins' chemical engineering interests found a practical outlet with Ormandy & Spence, consulting chemical engineers, engaged in plant design and erection. Meanwhile developing his original patents on the use of nickel formate for fat hardening, he later erected and operated the first plant for processing whale oil in Braca, Germany, and this highly successful venture came to an end in 1914, when he and many others were incarcerated, for the whole period of the war, in Ruhleben Camp. Amongst a very distinguished company of men of science and letters the boredom of captivity was alleviated by the building of laboratories for teaching and research, in all of which activities he took a leading part.

Dr. Higgins returned to Liverpool, and although in poor health continued his consulting work under the name of Higgins Brothers, and this led to the development for the first time in this country of a process for the manufacture of 2,3-hydroxynaphthoic acid: the production of the acid and its

arylides commenced in 1923 with British Synthetics Ltd., a subsidiary of United Water Softeners Ltd. of Brentford, the board of which company Dr. Higgins had joined. He returned to private consultancy work in 1930, where he remained until he became associated with Catomance Ltd., of which he became Managing Director in 1943, which post he held until his death. His energies during this time were directed to the development of shower-proofing and rotproofing products for the textile industry, and from small beginnings he built up the company to its present importance.

Dr. Higgins' wide interests in the chemical and biological fields are shown by the long and varied list of patents in his name, and his work was always his hobby. He threw himself with enthusiasm into new fields of research, and inspired all those who worked with him. In more recent years his work in the biological field had earned him a reputation which extended beyond the confines of his own laboratory to many European and American experts in this work. He held strong views as an individualist, and with more than a streak of Victorianism in his nature was a genial fellow and a born raconteur. His kindly approach to anyone with a problem endeared him to all with whom he came in contact, and no-one was denied a hearing. His large circle of friends in and out of business will miss him very much.

A. W. WALLER

New Books and Publications

Symposium over Kleur en Structuur van Organische Verbindingen

Brussels: Vlaamse Chemische Vereniging. [1958.] Pp. 198. Price, Belgian francs 150.

This is an account of a symposium held in Antwerp in October 1956, covering various aspects of the relationship between colour and structure of organic compounds. The introduction and many of the papers are in Flemish; others are in German or French; there are no contributions in English. Some of the Flemish papers carry summaries in German, French, and English, but these are quite inadequate to anyone not perfectly familiar with the subject-matter.

The symposium opened with a detailed review by Professor R. Wizinger of Basle of the classical treatment of colour theory and of modern valency concepts. The importance of the stability of various charged and radical forms was stressed, and existing dyes were classified on the basis of charged and uncharged chromophoric and auxochromic groups.

Several contributions dealt with the use of absorption measurements to elucidate or confirm structure in such types of compounds as flavones, formazans, merocyanines, etc. These contributions illustrate very well the fact that the phrase *colour and constitution* can no longer be applied in its narrowest sense, for nowadays absorption measurements are made as frequently in the ultraviolet and

infrared regions as in the visible part of the spectrum.

Other contributions dealt with the formation of complexes between dyes and surface-active agents, either in order to study critical concentration for micelle formation, or to investigate the nature of metachromasy—the colour change which takes place when such colour complexes are formed.

Dr. J. J. Jennen, who organised the symposium, also contributed two very interesting papers. In one he reviewed the work of Doub and Vandenbelt, and then gave his own electronic interpretation of absorption bands of benzene and simple benzene derivatives. In the other he developed his ideas still further, applying them to the basic dyes and to the phenomenon of metachromasy. Dr. Jennen's treatment of the problem of colour and constitution takes into account earlier work by Brooker, Lewis, and Calvin and by Simpson and others, but is a radically different approach, and has formed the subject-matter of six or seven papers since 1950. In order to follow the intricacies of Dr. Jennen's arguments, it is necessary to familiarise oneself with a completely new nomenclature and set of symbols. It is certainly to be regretted that no adequate account of this work has so far appeared in English, since much of the subject-matter would be difficult to follow even in a language with which one was familiar.

This is the second occasion when colour chemists have reason to feel indebted to photographic chemists for developments in the field of colour and constitution—in this case to Dr. Jennen and his colleagues from the firm of Gevaert, who contributed so fully to this symposium; in the earlier case to Brooker of the firm of Kodak, when in 1945 his work on the cyanine dyes was published.

W. L. LEAD

**Chemical Society Symposia
(Bristol 1958)**

Developments in Aromatic Chemistry

**Applications of Electron and Nuclear Resonance
in Chemistry**

**Recent Work on the Inorganic Chemistry of
Sulphur**

Special Publication No. 12. Pp. vii + 401. London: The Chemical Society. 1958. Price, 42s. 0d.

Among these three symposia the first (pp. 1-130) will be of greatest interest to readers of this *Journal*, though even here none of the papers is really closely related to the field of interest of the Society. The first two papers deal with the biosynthesis of aromatic systems, including such structures as anthocyanins, anthraquinones, and the coronene skeleton of the aphid chromophore. In a discussion of the metabolism of aromatic compounds it is mentioned that azo dyes undergo metabolic hydroxylation. On p. 33 it is stated that a solution of ascorbic acid or other ene-diol containing a small amount of iron (preferably co-ordinated) at pH 7 in air at room temperature appears to be able to hydroxylate any suitable aromatic compound that can be got into solution, even in the presence of organic solvents such as ethanol and acetone: this would seem to be a reaction of considerable importance. The structure of the blue azulenes and the coloured compounds which they form with aldehydes and with sodamide may yet throw light on the difficult question of "colour and constitution". This paper and those on diphenylene and the cyclobutadiene problem, the fundamentals of conjugation in ring systems, and benzyne C_6H_4 testify to the modern interest in the essential nature of aromaticity.

Although a wealth of chemical information is in principle obtainable by the techniques of nuclear and electron resonance, the second symposium (pp. 131-246) contains only incidental matter relevant to coloration—on colour centres in crystals, the structure of haemoglobin, coloured organo-sodium complexes, the trapping of free radicals during polymerisation, and the oxidation of phthalocyanines, which has been shown to involve a mobile π electron in the ring system.

The third symposium (pp. 247-401), on the inorganic chemistry of sulphur, is, again, mainly of marginal interest, with such items of information as the existence of long-chain sulphur compounds (up to about S_{360}) and the production of aromaticity by an octet of electrons rather than the usual organic sextet. One paper, however, is of more direct interest, for in it (pp. 363-390)

F. H. Pollard and D. J. Jones deal with the inter-relations of the sulphur oxy acids, some of which are important reducing agents in dyeing and printing. Thus the dithionite ion has been shown to be non-planar, each half forming a shallow pyramid with the sulphur atom at the apex, and sulphylic acid is thought to exist in two forms— $H-SO-OH$ (cf. $H-COOH$) and $S(OH)_2$. The reaction between sodium formaldehyde-sulphoxylate and thiosulphuric acid is discussed.

C.J.W.H.

New Books received

Heterocyclic Chemistry. An Introduction. ADRIEN ALBERT. London: The Athlone Press, University of London. 1959. Pp. x + 424. 45s. 0d.

Cotton Fibre Maturity Test (Estimation by classification of fibres swollen in sodium hydroxide solution). B.S. 3085: 1959. London: British Standards Institution. Pp. 8 + 1 half-tone. 3s. 0d.

Test for Recovery of Fabrics from Creasing. B.S. 3086: 1959. London: British Standards Institution. Pp. 12. 4s. 0d.

Technical Authorship. 229. London: City and Guilds of London Institute. March 1958. Pp. 9. 9d.

Handleiding voor het Toepassen van Spectrofotometrie en Kleurmeting. Mededeling No. 116. L. F. C. FRIELE. Delft, Holland: Vezelinstituut T.N.O. 1958. Pp. vi + 53 + 1 insert + 50. No price.

Recent Advances in the Chemistry of Cellulose and Starch. J. HONEYMAN. London: Heywood & Co. Ltd. 1959. Pp. viii + 358. 60s. 0d.

Friction in Textiles. H. G. HOWELL, K. W. MIESZKIS, and D. TABOR. London and Manchester: Butterworths Scientific Publications and The Textile Institute. 1959. Pp. xii + 263 + 5 plates. 42s. 0d.

Visual Problems of Colour. Proceedings of Symposium No. 8 held in September 1957. Volume I—Pp. viii + 1 plate + 368. Volume II—Pp. ii + 369-749. NATIONAL PHYSICAL LABORATORY. London: Her Majesty's Stationery Office. 1958. 42s. 0d. (two volumes).

Handbuch des Chemikers. Band II—Physikalische Eigenschaften Anorganischer und Organischer Verbindungen. B. P. NIKOLSKI. (Translated from Russian by G. and M. Frank.) Berlin: VEB Verlag Technik. 1957. Pp. 818 + viii. DM 42.00.

Handbuch für Textilingenieure und Textilpraktiker. Fachteil T63—Textildruck. K. SCHMIDT. Wuppertal-Elberfeld, Germany: Dr. Spohr-Verlag. [1951.] Pp. viii + 113. Paperboard DM 6.50. Cloth DM 8.00.

British Instruments. Directory and Buyers' Guide 1959. SCIENTIFIC INSTRUMENT MANUFACTURERS' ASSOCN. London: United Science Press Ltd. [1959.] Pp. 276 + i + R1-R293 + 277-322. 42s. 0d.

The Sequestration of Metals. Theoretical Considerations and Practical Applications. ROBERT L. SMITH. London: Chapman & Hall Ltd. 1959. Pp. vii + 256. 42s. 0d.

Education for Careers in Textiles. Manchester: Textile Institute. 2nd edition 1959. Pp. 62. Gratis.

Report to the Worshipful Company of Clothworkers of the City of London of the Advisory Committee on the Departments of Textile Industries, and Colour Chemistry and Dyeing in the University of Leeds. Session 1957-1958. Leeds: The University. [1958.] Pp. 47.

Publications and Titles of Theses, 1956-1957. Leeds: The University. 1959. Pp. 77. 6d.

Jaarverslag 1957. Delft, Holland: Vezelinstituut T.N.O. [1959.] Pp. 65. No price.

Peter Griess—Leben und Wirken eines grossen Farbstoffchemikers. AUGUST WINGLER. Leverkusen-Bayerwerk, Germany: Farbenfabriken Bayer AG. 1958. Pp. 39.

Abstracts from British and Foreign Journals and Patents

The titles of abstracts may be modified. Abbreviations of names of firms are listed in J.S.D.C., 68, 23 (Jan. 1952) and also, together with symbols and the periodicals abstracted, in the annual index

I—PLANT; MACHINERY; BUILDINGS

Continuous Dyeing of Thick Fabrics by Vacuum-suction Technique

A. D. Malikov *Tekstil. prom.*, 19, 52-55 (Jan. 1959)

Thick (e.g. 0.8 mm.) fabric is carried over a suction slot by a fine-mesh metal gauze to reduce friction on the fabric, the dye liquor being circulated preferably by a centrifugal pump. Improved penetration with greater overall production speed is claimed, but max. temp. does not exceed 85-90°C. Cloth thickness and construction, liquor and cloth speed, length of suction slot, and hydraulic pressure are interrelated by a set of mathematical formulae. G.J.K.

PATENTS

Drying Yarn Cakes by Dielectric Heating

Magnetic Heating Corpn. *USP* 2,866,063

Cakes of yarn, preferably with their central holes vertical, are rotated between a pair of electrodes at opposite sides of the cakes. The electrodes are connected respectively to the two terminals of a high frequency current source and to an intermediate electrode, e.g. a metal cylinder placed within the hole in the cake, which is insulated from the circuit of the other two electrodes. Presence of this intermediate electrode eliminates the "air core" so that the electrical field follows paths directly from one of the side electrodes through the side of the cake to the intermediate electrode and thence through the other side of the cake to the other electrode. This eliminates variations in shrinkages in the fibres in different parts of the cake as well as within the cross-sections of individual fibres. C.O.C.

Warp Sizing Machine

Batson-Cook Co. *USP* 2,866,254

A machine in which the warp is squeezed while it is immersed in the sizing solution. C.O.C.

Preparing Cloth for a Tenter

Famatex *BP* 812,729

The cloth is positively undulated by passing between an endless toothed belt and a coating indenting pulley having a resilient rim. The belt and pulley run at a speed corresponding to that of the tenter chains. They engage the cloth both before as well as in the region at which the cloth is received and removed by the tenter chains. C.O.C.

Drying Fabric, Webs, Films, etc.

J. P. Bemberg *BP* 812,429

When fabric or the like is dried by hot air being blown on to it from a slot extending across the width of the fabric the edges of the fabric are overdried. This overdrying can be avoided if in the first third of the apparatus the air is blown on to the full width of the fabric, while at the beginning of the second third the air is blown only on to the middle 50-70% of the width of the fabric and then progressively over an increasing width, so that the air is blown on to the middle 90% of the width of the fabric at the end of the second third of the apparatus. C.O.C.

Suction Cleaner for Doctor Blades for Drying Rollers

C. M. Shockey *USP* 2,859,537

A tube with a longitudinal helical slot is mounted rotatably within an outer tube fitted with a plurality of separate suction ports, arranged longitudinally. On rotation of the inner tube the helical slots are brought progressively into register with the suction ports so that the vacuum is localised or concentrated at a small port area near the doctor blade and moves progressively along the doctor blade. The need for high capacity pumping equipment is thus eliminated. R.A.

Resilient Lapping Material for use with Cylinder Printing Machines

W. R. Grace & Co. *BP* 812,495

Screen Printing Frame

Screen Process Supplies *BP* 813,007

A frame which incorporates improved means for stretching the silk or other base for the stencil tightly across the frame. C.O.C.

Silk Screen Printing Machine

J. A. Black *USP* 2,866,405

A fully automatic, high speed machine for printing on sheet metal, glass, plywood and other rigid or semi-rigid materials of substantial thickness. C.O.C.

Regeneration of Spent Aqueous Alkali

Esso Research & Engineering Co. *BP* 812,377

Apparatus of the type in which the spent alkaline liquor is led into a compartment separated by an ion exchange membrane from a second compartment containing an electrolyte in solution. A suitable electrical potential is applied between the two compartments. The regenerated cationic constituents of the spent liquor are collected from the second compartment. C.O.C.

Electronic Engraving of Printing Rollers (IX p. 404)

Laminated Printing Block (IX p. 404)

II—WATER AND EFFLUENTS

PATENTS

Clarifying, Softening, and Decolorising Water

O. Bacon and W. C. Horton *USP* 2,866,759

A mixture of 20-70% limestone, 5-20% NaOH (70%), 5-20% sodium aluminate and 20-70% aluminium sulphate, ferric or ferrous sulphate added to the raw water is a cheap, effective, and rapid agent for softening and decolorising water. There is no after-precipitation and a clean and stable water is produced. C.O.C.

Reducing the B.O.D. of Effluents containing Starch

Hercules Powder Co. *USP* 2,865,853

Adding a water-soluble ether of starch, e.g. carboxymethylated starch, to an effluent containing starch much reduces the biochemical oxygen demand of the starch in the effluent.

USP 2,865,854

The same effect is obtained by adding a water-soluble cellulose ether, e.g. sodium carboxymethyl cellulose. C.O.C.

Disposal of Pulp Mill Effluents

Courtaulds *BP* 812,438

The liquid content is evaporated in a heated steel chamber containing a material of high thermal capacity, e.g. checker brickwork. Non-volatile oxidisable components are oxidised by passing air over the solid residue. The heat produced by the exothermic reaction reheats the chamber for the next charge. The steam evolved at 200 p.s.i. in the first stage may be used as a source of power for various purposes. The ash produced is cleared out at intervals. R.A.

III—CHEMICALS; AUXILIARY PRODUCTS; FINISHING MATERIALS

Micellar Molecular Weights of Normal Paraffin Chain Salts in Dilute Aqueous Solutions

H. V. Tartar *J. Colloid Sci.*, 14, 115-122 (April 1959)

Revised values are given for micellar molecular weights of four normal paraffin chain salts in dilute aqueous solution. A model of a spherical micelle is proposed and used to estimate molecular weights, which are in good agreement with experimental values. W.R.M.

PATENTS

Solvents for Vinylidene Cyanide Alternating Interpolymers

B. F. Goodrich Co. *BP* 809,346

Interpolymers in which the chain is made up of alternate vinylidene cyanide and olefinic groups dissolve readily

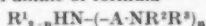
in sulfoxides of formula R_2SO (R = Alk or chlorinated alkyl of 1-3 C) to yield solutions, especially those containing 8-30% of the interpolymer, which are clear, viscous and stable on storage. C.O.C.

Quaternary Ammonium Compounds containing an Epoxy-propyl Group bound to the Nitrogen Atom—Auxiliary Agents

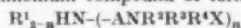
Ciba BP 812,180
Quaternary ammonium compounds containing only one quaternary N atom to which are bound 4 aliphatic or cycloaliphatic radicals of which at least one is hydroxyalkyl which may be etherified or esterified, at least one is a high-mol.wt. hydrocarbon radical, and the remainder contain an epoxy group, any C atom bound to 2 N atoms carrying only single bonds, have wide uses as assistants in the processing of textiles, leather, and paper. Thus the product obtained by heating a commercial mixture of octadecenyl-, hexadecyl-, and octadecylamine at 105-110°C. in presence of metallic sodium and a cement of ethylene oxide in nitrogen is treated with epichlorohydrin in an inert atmosphere, is used as a softening agent for textiles or mixed with a small amount of triethylene tetramine as an antistatic agent for nylon. C.O.C.

Linear Copolymers—Auxiliary Agents

Rohm & Haas Co. BP 812,140
A polymer containing < 20% of an alkyl acrylate methacrylate, ethacrylate or propacrylate is aminolysed with either (a) an amine of formula—



(R^1 = H or Alk of 1-4 C; A = alkylene of 2-10 C or a divalent saturated aliphatic group consisting of several alkylene groups of 2-10 C, each pair of groups being connected by an ether O atom; R^2 and R^3 = same or different Alk of 1-12 C, hydroxyalkyl of 2-12 C, alkoxyalkyl of 2-12 C, (polyalkoxy)alkyl of 2-12 C or together are the atoms to complete a 5-6-membered ring in which 4 or 5 atoms are C, 1 is the N atom in the above formula and the remaining atom is O, S or N which may be substituted by Alk of 1-18 C; n = 1 or 2) or (b) < 20% of a quaternary ammonium compound of formula—



(R^4 = satd. or unsatd. aliphatic hydrocarbon of 1-18 C, a (polyalkoxy)alkyl of 2-18 C, hydroxyalkyl of 2-18 C, subst. or unsubst. aralkyl of 7-24 C, or a phenoxyalkyl group of 7-24 C; X = OH or a negative, salt-forming radical). The products have wide uses as rotproofing, antistatic, dispersing and softening agents, for modifying the dyeing properties of cellulose acetate and acrylonitrile polymers and as anchoring agents when applying acrylic copolymers, e.g. of acrylic acid, to paper pulp. C.O.C.

Dispersing Agents and Protective Colloids

BASF BP 813,463

Water-soluble copolymers containing < 15% by weight of carboxylic acid amides and whose k -value has been increased by heating their aqueous or water-containing solution to > 50°C. are very good dispersing agents. Thus paraffin wax m.p. 68-72°C. (500 parts) mixed with a 1% solution (500) of a copolymer of methacrylamide (90) and N -vinyl pyrrolidine which has been heated as a 20% aqueous solution for 42 hr. at 95°C., yields a stable creamy emulsion suitable as a water-repellent finish for textiles. Similarly iron oxide (C.I. Pigment Red 101) (10) and TiO_2 (C.I. Pigment White 6) (10) mixed with a 5% aqueous solution (80) of a copolymer of methacrylamide (25%) and acrylamide (75%) which has been heated for 30 hr. at 95°C. yields a stable dispersion which can be used directly as a paint. C.O.C.

Lubricant for Acetate Fibres

DuP USP 2,865,855

Acetate fibres treated with a mineral-oil-based lubricant containing a little of the acetylation product of the ricinoleic ester of 2-methoxyethanol are given a softer handle. C.O.C.

Titanium Ester Catalysts for Silicone Water-repellent Finishes

Monsanto BP 812,505

Titanic esters of dihydric alcohols are good catalysts for use in aqueous emulsions of silicones used to impart a water-repellent finish to textiles. Such a catalyst may be obtained, e.g. by heating $TiCl_4$ and 1,3-butanediol together

at 116°C. until a product soluble in water is obtained. This product is then heated with triethanolamine at 170°C. to yield a catalyst solution which forms no precipitate when diluted with water. C.O.C.

Polyamine Catalyst for Polysiloxanes

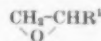
Parmacel Tape Corp. BP 813,313

Polyamines of formula R^1NH_x (R^1 = Alk, Ar, aralkyl or alkaryl and is substituted by NH_2 or $A-(R^2NH)_x$ (R^2 = alkylene, arylene, aralkylene or alkarylene; A = H, NH_2 or R^1 ; x = 1-10), preferably those of formula $NH_2(CH_2)_xNH_2$, and particularly tetraethylene pentamine, are good catalysts for use in silicone finishes, etc. They enable curing to be carried out faster and at lower temperatures than has hitherto been possible. C.O.C.

Polymeric Phosphate Esters—Plasticisers and Flame-resisting Agents

Union Carbide Corp. BP 812,390

The products obtained by treating an oxirane of formula



(R^1 = H, methyl, ethyl or halogenomethyl) with a phosphoric diester of formula $HO-PO(OR^2)_2$ (R^2 and R^3 = Alk, halogenoalkyl, Ar, halogenoaryl, alkaryl or alkaryl), e.g. $(C_4H_9O)_2PO[OCH_2CH_2]_{3-36}OH$ obtained by treating dibutylphosphoric acid with ethylene oxide, are used as plasticisers for polymers containing vinyl acetate and vinyl chloride and as flame-resisting agents. C.O.C.

Ultraviolet Radiation Absorbents

General Aniline BP 812,726

Xenylamines of formula—



or



(R^1 = H, Alk or Ar; R^2 = H, Alk, aromatic, sulphonyl, arylsulphonyl, aralkyl, carboxyalkyl or alkylsulphonyl; R^3 = Alk or Ar; Y = hydroxyl or arylamine; Z = atoms to complete a quinoline nucleus), e.g. 4-amino-4'-benzoyl-biphenyl, 4-acetyl-4'-aminobiphenyloxime, and 2-(4'-aminobiphenyl)-6-sulphophenonic acid, are brilliant minus ultraviolet dyes in that they have high extinction coefficients in the ultraviolet with a particularly sharp drop in absorption on the edge of the visible range of the spectrum. Used in thin layers, e.g. 1-2 μ . thick, they are highly effective ultraviolet radiation absorbents. C.O.C.

Chemicals for Non-woven Fabrics (VI p. 400)

Flame-resisting Finishing (X p. 405)

Starch Phosphates—Sizes for Pulp and Paper (XI p. 407)

IV—RAW MATERIALS; INTERMEDIATES; COLOURING MATTERS

Conjugation in Benzene

M. I. Batuev

Zhur. obshch. khim., 28, 3147-3154 (Nov. 1958)

The author claims that the sixfold symmetry of the benzene molecule is disproved by modern experimental data—on bond lengths, dipole moments, magnetic susceptibilities, molecular volumes and refractions, spectra, and the formation of isomers in the azo coupling of 1,3,4-xylene—and even the threefold symmetry is applicable to only a limited extent. G.J.K.

Structure of Addition Products of Aromatic Amines with Zinc Halides

A. V. Ablov and T. I. Malinovskii

Doklady Akad. Nauk. S.S.S.R., 123, 677-680 (1 Dec. 1958)

An X-ray crystallographic investigation of $ZnCl_2 \cdot 2H_2N-C_6H_4-CH_3$ and $CoCl_2 \cdot 2H_2N-C_6H_4-CH_3$ has proved

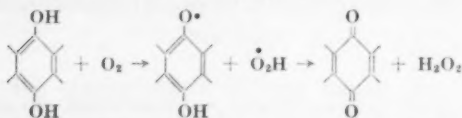
that these two structures are identical. In each case the metal atom is at the centre of an almost regular tetrahedron, the two chlorine and nitrogen atoms occupying the tetrahedral positions. The (010) electron density projection for the Zn complex is given. G.J.K.

Isotopic Investigation of the Formation of Hydrogen Peroxide during Oxidation of 2-Ethylantrahydroquinone and of Isopropanol

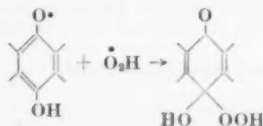
A. I. Brodskii, V. I. Franchuk, M. M. Aleksankin, and V. A. Lunenok-Burmakina

Doklady Akad. Nauk S.S.S.R.,
123, 117-119 (1 Nov. 1958)

Treatment of 2-ethylantrahydroquinone (I) with CH_3OD and subsequent oxidation with gaseous oxygen (5 hours) yields a hydroperoxide of I from which hydrogen peroxide is extracted with water, and the following radical mechanism of oxidation is suggested—



with a possible intermediate formation of 9-, or 10-hydroperoxide—



Similarly, oxidation of isopropanol (using ^{18}O) is formulated with a two-stage mechanism— $(\text{CH}_3)_2\text{CH}(\text{OH}) + \text{O}_2 \rightarrow (\text{CH}_3)_2\dot{\text{C}}-\text{OH} + \dot{\text{O}}_2\text{H} \rightarrow (\text{CH}_3)_2\text{C}=\text{O} + \text{H}_2\text{O}_2$.

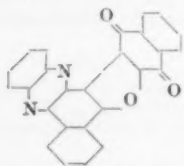
G.J.K.

Utilisation of 1,4-Naphthoquinone. V—Derivatives from Naphthophenazine Naphthosultamphenazine and Brazanquinone

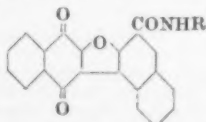
A. Inoue, N. Kuroki, and K. Konishi

Yūkei Gōsei Kagaku Kōkai Shi, 16, 603-606;
Chem. Abs., 53, 3233 (25 Feb. 1959)

1,4-Naphthoquinone treated with acetic anhydride and H_2SO_4 gives triacetoxynaphthalene which is oxidised with $\text{Na}_2\text{Cr}_2\text{O}_7$ to 2-hydroxy-1,4-naphthoquinone. Condensation with *o*-phenylenediamine yields 6-hydroxy-1,2-naphthophenazine. A similar preparation gives 1,2-benzo-6-hydroxynaphthophenazine. Vat dyes are obtained by condensing these intermediates with 2,3-dichloro-1,4-naphthoquinone; e.g.—



Dyeing and other properties are studied along with those of C.I. Vat Yellow 27 and—



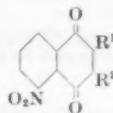
(R = phenyl, *o*-methoxyphenyl, *o*-chlorophenyl, 2-naphthyl or 1,4-dimethoxy-2-naphthyl). It is found that photosensitized tendering is less in naphthosultamphenazine derivs. containing no furan ring and greater in brazanquinone derivatives containing a furan ring.

VI—Derivatives of Naphthoquinonemonoimine

Ibid., 607-609

1,4-Naphthoquinone is halogenated to give the 2,3-dichloro- (or bromo) derivative. Nitration followed by treatment of the resulting mono-nitro-deriv. with NH_4OH

yields 2-amino-3-chloro-5-nitro-1,4-naphthoquinone. By similar procedures a series of compounds are made of formula—



(R^1 = hydroxyethylamino, morpholyl, *p*- $\text{NH}_2\text{C}_6\text{H}_4\text{NH}_2$; R^2 = Cl). Treatment of these compounds with 8 in fuming H_2SO_4 at 35-45°C. gives naphthoquinonemonoimines which are dyes for acetate rayon, Vinyon, Amylan and Terylene. Dyeing and fastness properties of these products were tested. E.T.

Ferrous Ion and Ascorbic Acid as Electron Donors in Photochemical Reactions of Porphyrins and Chlorophyll in Aqueous Media

A. A. Krasnovskii and A. V. Umrikhina

Doklady Akad. Nauk S.S.S.R.,
122, 1061-1064 (21 Oct. 1958)

Hematoporphyrin (I) and protoporphyrin (II) undergo reversible photoreduction with ascorbic acid in 2N sulphuric acid, but not with ferrous ion, the reduced form of I and II showing an absorption max. at 500 mμ. On the other hand, investigations of the ternary system: pigment (chlorophyll, or porphyrin)-electron donor (ascorbic acid, or ferrous ion)-electron acceptor (methyl red) have shown photosensitized reduction of methyl red to occur with both ascorbic acid and ferrous ion.

G.J.K.

Syntheses in the Carotenoid Series

O. Isler, W. Guex, H. Lindlar, M. Montavon, R. Rüegg, G. Ryser, G. Saucy, and U. Schwieter

Chimia (Switz.), 12, 89-90 (1958);
Chem. Abs., 53, 1405 (25 Jan. 1959)

$\text{NaC}\equiv\text{CH}$ in liquid NH_3 reacts with the ethyl enol ether of $\text{CH}_3\text{CH}(\text{CHO})_2$ to give a product which treated with alcoholic ethyl orthoformate forms 2-methyl-1,1-diethoxy-2-penten-4-yne. New syntheses based on this product are outlined for the following carotenoids: β -apo-4-carotenal, β -apo-3-carotenal, β -apo-2-carotenal, γ -carotene (C.I. 75130), C_{22} -acid, lycopene (C.I. 75125), bisdehydroretro- C_{10} -aldehyde, dehydroisoeaxanthin diacetate and canthaxanthin. C.O.C.

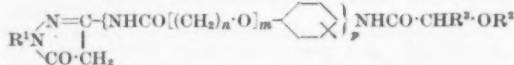
PATENTS

1-Alkyl-3-acylamido-5-pyrazoline Colour Couplers

Eastman Kodak Co.

USP 2,865,751

Compounds of formula—



(R^1 = Alk of 1-12 C; R^2 = monocyclic Ar; n = 1 or 2; m = 0 or 1; p = 1, 2 or 3), e.g. 1-methyl-3-[α -(α -(2,4-di-*t*-amylphenoxy)butylamido)phenoxy]acetamido]-5-pyrazolone, have a wide range of light absorption than dyes prepared from previously known 1-alkyl-3-acylamido-5-pyrazolones. They are particularly suitable for use with benzoylacet-*o*-alkoxyanilide yellow dye-forming couplers in multilayer films for colour photography. C.O.C.

Calcium Carbonate (C.I. Pigment White 18)

Sinclair Manufacturing Co.

USP 2,865,781

Modification of USP 2,762,686. Addition of $\geq 25\%$ on the weight of the limestone of silica to the melt results in production of a pigment of particle size much smaller than has hitherto been obtainable. C.O.C.

3,8 - Dimethyl - decatene - (3,5,7) - diene - (1,9) - Intermediate for making Carotenoids

F. Hoffmann-La Roche & Co.

BP 812,268

The title substance is made by treating a triphenyl-[3-methylpenten-(2)-yn-(4)-yl-(1)]phosphonium halide with phenyl-lithium in presence of a cold solvent or diluent and heating the resulting mixture containing triphenyl-[3-methyl-penten-(2)-yn-(4)-ylidene-(1)]-phosphine with 3-methyl-penten-(2)-yn-(4)-al-(1).

C.O.C.

C₄₀-Diols—Intermediates for making Carotenoids

F. Hoffmann-La Roche & Co. BP 812,269

3,8-Dimethyl-decatriene-(3,5,7)-diyne-(1,9) is bilaterally condensed with a 4-substituted 2-methyl-buten-(2)-al-(1) whose 4-substituent is 2,6,6-trimethyl-cyclohexadien-(1,3)-yl or a 2,6,6-trimethyl-cyclohexen-(1)-yl which may contain an acyloxy group in the 4-position, in an alkali-metal or Grignard reaction. The product is then hydrolysed to yield the required C₄₀ diol. C.O.C.

all-trans-Carotenoids—Orange to Red Food Dyes

F. Hoffmann-La Roche & Co. BP 812,267

3,8-Dimethyl-decatriene-(3,5,7)-diyne-(1,9) is bilaterally condensed with a 4-substituted 2-methyl-buten-(2)-al-(1). The 4-substituent is either 2,6,6-trimethyl-cyclohexadiene-(1,3)-yl or 2,6,6-trimethyl-cyclohexen-(1)-yl which may contain an acyloxy group in the 4-position. The condensation is carried out by an alkali-metal or Grignard reaction. The product obtained is hydrolysed and 2 mol. of water eliminated from the resulting 1,18-disubstituted-3,7,12,16-tetramethyl-4,15-dihydroxy-octadecapentaene-(2,7,9,11,16)-diyne-(5,13). Any 4'-acyloxy groups present may then be hydrolysed if desired. Finally the 1,18-disubstituted-3,7,12,16-tetramethyl-octadecapentaene-(1,13,7,9,11,15,17)-diyne-(5,13) has its triple bonds catalytically hydrogenated to double bonds and the resulting *di-cis* carotenoid is isomerised to the corresponding *all-trans* carotenoid. Examples are given of the syntheses by this method of β -carotene, *all-trans*-3,4,3',4'-bisdehydro- β -carotene and zeaxanthine. C.O.C.

Producing β -Carotene (C.I. 75130) and Related Substances by Mixed Culture Fermentation

U.S. Secretary of Agriculture USP 2,865,814

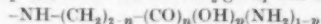
Carotenoids are produced by cultivating + and - mating type strains of fungi belonging to the class *Phycomycetes* and the order *Mucorales*, particularly of two different species of the genus *Choanephora*, together in an aqueous nutrient medium. This medium is made up of an assimilable fermentable carbohydrate, assimilable nitrogen, thiamin, and essential mineral salts. The combined cultures are incubated under submerged aerobic conditions. The initial pH of fermentation is 5.0-6.5 and the temperature 20-30°C. Usually 3-5 days are required for a good yield of carotenoids. At the close of fermentation the mycelium and other solids are removed by filtration. The carotenoids are present mainly in the mycelium thus produced. C.O.C.

Nitrophenylenediamine Hair Dyes

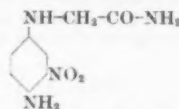
Société Monsavon-L'Oreal

BP 812,211

Stable nitrophenylenediamines suitable for dyeing human hair at moderate temperatures from weakly alkaline solutions are mono-nitrated *o*-phenylenediamines having the NO₂ group in a *p*-position to the amino group or mono-nitrated *p*-phenylenediamines in which the amino group furthest from the NO₂ group has the formula



($n, p = 0$ or 1 and n is at least equal to p). Thus,



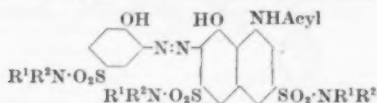
gives a red tint when applied to hair as a 1% solution made weakly alkaline with ammonia. This compound is made by condensing chloroacetamide with nitro-*p*-phenylenediamine under reflux with water and CaCO₃. E.T.

Violet and Blue Metal-complex Monoazo Dyes for Wool, etc.

General Aniline

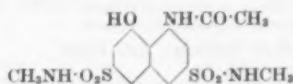
BP 811,521

The complexes containing 1 atom of Cu, Ni, Fe, or preferably Co or Cr, and 2 mol. of monoazo compounds—



(R₁, R₂ = H or Alk, or may be linked to give a heterocyclic ring) dye wool, nylon, etc. from neutral solutions or

dispersions. Thus *N*-acetyl-H acid is heated with chlorosulphonic acid to give the sulphonyl chloride, which with methylamine gives the methylamide—



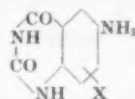
which is coupled in presence of pyridine with diazotised 2-aminophenol-4-sulphonamide. Heating with chromium formate in formamide gives the complex, which is dried in admixture with a dispersing agent, to give a product which dyes nylon reddish-blue. E.S.

Monoazo Pigments from 6-Amino-2,4-dioxotetrahydroquinazolines

FBy

BP 811,953

6-Amino-2,4-dioxotetrahydroquinazolines



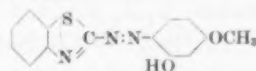
(X = H or substituent other than SO₂H or COOH) made, e.g. by reacting 5-acetamidoanthranilic acid with KCNO followed by hydrolysis of the acetamido group, are diazotised and coupled with arylides of 3,2-hydroxynaphthoic acid, acetoacetylides, 1-phenyl-5-pyrazolone, or 2,4-dihydroxyquinoline to give monoazo pigments. Thus 6-amino-2,4-dioxotetrahydroquinazoline diazotised and coupled with 3-hydroxy-2-naphtho-*o*-aniside gives a bordeaux. E.S.

Metallisable Disperse Monoazo Dyes

Eastman Kodak Co.

USP 2,865,909

Disperse dyes obtained by coupling diazotised 2-aminobenzthiazoles with suitable phenols may be metallised on cellulose acetate, preferably by steaming with nickel thiocyanate, to give dyeings of good wet fastness, and may also be applied to polyester and polyacrylonitrile, etc., fibres. Thus 2-amino-6-methoxybenzthiazole diazotised and coupled with resorcinol monomethyl ether gives—



which dyes cellulose acetate reddish-orange converted to deep navy blue by steaming, after padding with nickel thiocyanate. E.S.

Monoazo Anthraquinone Pigments for the Mass Coloration of Synthetic Polymers

General Aniline

BP 811,524

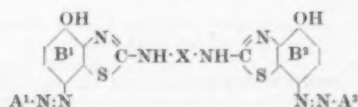
The pigments formed by coupling diazotised 2-amino-3-chloroanthraquinone-9,10-disulphuric ester with arylides of 3-hydroxy-2-naphthoic acid, followed by hydrolysis of the sulphuric ester groups and oxidation, are suitable for incorporation in the spinning solutions of synthetic polymers, particularly cellulose acetate. The red pigment produced when the *o*-aniside of 3-hydroxy-2-naphthoic acid is the coupling component is of outstanding brightness, light-fastness, and strength. E.S.

Metallisable Disazo Direct Dyes having Benzthiazole Residues

ICI

BP 811,740

The title dyes are of formula—



(A¹, A² = aryl; X = a linking group, e.g. CO, terephthaloyl, fumaryl, and 2,4-divalent-1,3,5-triazinyl having NH₂ or subst. amino in the 6-position; the rings B¹, B² may carry substituents). If > 2 SO₂H and/or COOH groups are present the Cu or Ni complexes are sufficiently soluble to be applied directly to cellulose. When < 3 such solubilising groups are present the azo compounds, or their sulphate esters, are first applied and metallisation is

effected on the fibre. Thus 2 mol. of diazotised aniline-2,5-disulphonic acid are coupled with 1 mol. of *NN'*-di(4-hydroxy-2-benzthiazolyl) urea, and the disazo compound is stirred at 70°C. with ammoniacal CuSO_4 to give the complex, which dyes cellulose yellow. E.S.

Greenish-yellow Stilbene Azo Dyes

American Cyanamid Co.

USP 2,865,908

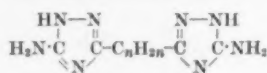
The presence of water-soluble salts of alkali metals or alkaline earth metals during the reduction of dinitro-stilbenedisulphonic acid with, preferably, formaldehyde gives dyes which are a greener yellow than those obtained in absence of such salts. NaCl at a concentration of 8–9% is suitable. E.S.

Bis-(triazolyl)-azo Direct Dyes

Research Corp'n.

USP 2,863,859

The diamines of USP 2,744,116—



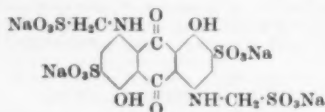
($n = \text{integer} < 13$) are tetrazotised and coupled with suitable coupling components to give direct dyes. Thus 3-tetramethylenebis(5-amino-1,2,4-triazole) ($n = 4$) dissolved in aq. H_2SO_4 is tetrazotised with NaNO_2 and coupled with 2 mol. of salicylic acid to give a yellow. E.S.

Anthraquinone Dyes for preventing Light-scattering in Photographic Emulsions

Eastman Kodak Co.

USP 2,865,752

Anthraquinone dyes containing at least one alkaline sulphomethylamino group and having maximum absorption in a region of the spectrum to which a photographic emulsion is sensitive can be incorporated in the emulsion to overcome the harmful effects produced by the light-scattering of the silver halide grains. An example of such a dye is—



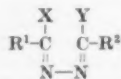
C.O.C.

Anthraquinone Chloroaldazine Vat Dye Intermediates

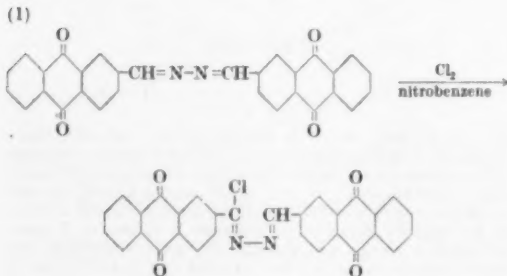
American Cyanamid Co.

USP 2,863,883

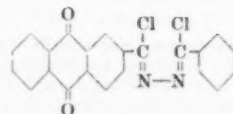
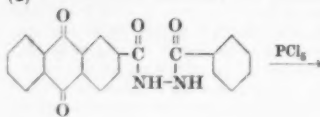
These intermediates are *mono*- and *di*-chloroaldazines of formula—



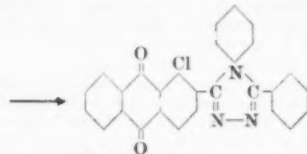
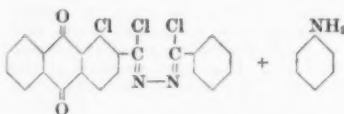
(X, Y = H or Cl but either X or Y = Cl; $\text{R}^1, \text{R}^2 = \text{aryl radicals}$ one of which is 2-anthraquinonyl). Methods of preparation are (1) chlorination, e.g. with Cl_2 in nitrobenzene at temperatures $> 60^\circ\text{C}$. giving *monochloroaldazines* when the anthraquinonyl radical is free from NH_2 or OH; (2) reaction of diacylhydrazines with PCl_5 at temperatures $> 100^\circ\text{C}$. to give *dichloroaldazines*. Thus—



(2)



Use of PCl_5 in reaction (2) is specific and thionyl chloride, etc., cannot be used. The 2-anthraquinonyl radical may have substituents as e.g. 1-nitro, 1-amino, 1-chloro, 5-amino, 4-bromo-1-amino, etc. The phenyl radical may have substituents as e.g. methoxy, Alk, Hal, etc. The *mono*- and *di*-chloroaldazines react with arylamines and aminoanthraquinonyl-1,2,4-triazole vat dyes can be made as follows—



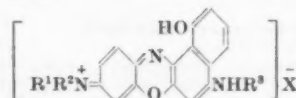
The Cl group is then replaced by NH_2 by reaction with ammonia. E.T.

Oxazine Dyes for Dyeing and Printing Acrylonitrile Polymers

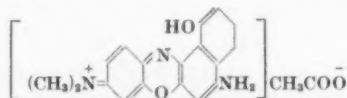
FBy

BP 812,227

Dyes of formula—



($\text{R}^1 = \text{H}$ or subst. or unsubst. Alk; $\text{R}^2 = \text{Ar}$, aralkyl or subst. or unsubst. Alk; $\text{R}^3 = \text{H}$, $-\text{CH}_2\text{CH}_2\text{CH}_2-$ or $-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2-$ linked to the aromatic nucleus in *ortho* position to NH ; X = acid radical; the aromatic nucleus may contain further substituents) applied in presence of acid yield dyeings and prints of excellent fastness to light and very good fastness to other agencies. Thus bluish green dyeings are obtained with the dye—



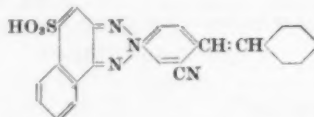
C.O.C.

Triazole Fluorescent Brightening Agent

American Cyanamid Co.

USP 2,865,916

The compound—



has good fluorescence, excellent substantivity for cellulose, nylon and other fibres, and is fast to light and bleaching compositions. C.O.C.

Silica-Sulphite Pigments

Columbia-Southern Chemical Corp. USP 2,865,780

Adding an alkaline earth metal salt, e.g. CaCl_2 or BaCl_2 , to an aqueous dispersion of silica in presence of sulphite ions results in the rapid settling out of a white pigment which is readily filtered off. This pigment consists of hydrated silica of average particle size $< 0.1 \mu$. and alkaline earth metal sulphite of average particle size $< 10 \mu$. It is particularly suitable for use with rubber.

C.O.C.

Silica Pigments (C.I. Pigment White 27) for Use in Rubber

Columbia-Southern Chemical Corp. BP 813,453

Pigment of particle size $< 0.1 \mu$, containing at least 75% SiO_2 (calculated on the formula $\text{H}_2\text{O}(\text{SiO}_2)_{1.5-2.5}$) and of surface area 25-250 sq.m./g., when coated with an ethylenically or acetylenically unsaturated organopolysiloxane when used in rubber mixes results in products having improved resistance to abrasion and greatly improved tensile, tear, and modulus properties.

C.O.C.

Alterations in the Ranges of FD&C and Ext.D&C Colours (XV p. 412)

V—PAINTS; ENAMELS; INKS**Pigmentation of Flat Paints—II**

F. A. Lilley and H. A. Phelps

Off. Dig. Fed. Paint Varn. Prod. Cl.,
31, 375-391 (March 1959)

The pigmentation of interior alkyd flat paints is discussed. Use of a fine particle-size extender of high oil-absorption in combination with extenders of low oil-absorption, permits the TiO_2 content of white paints to be reduced, giving a substantial drop in cost with only small sacrifice in hiding power and reflectance. Selection of the proper ratio of high- and low-absorption extenders at a given pigment volume concentration, enables equal wet-to-dry hiding power ("contrast equilibrium") and colour to be obtained. Because of the high degree of hiding power developed by these methods an enamel grade anatase TiO_2 may be substituted for a rutile TiO_2 , with further cost-saving and minimal loss in hiding power.

J.W.D.

Behaviour of Titanium Dioxide Pigments in Alkyd-Amino Resin Systems—I

H. D. Jefferies

J. Oil & Col. Chem. Assoc., 42, 201-239 (March 1959)

Pigment dispersions are stabilised by the production of an oriented layer of adsorbed resin molecules, and probably consists of the lower polymers. Sufficient milling medium must be present during dispersion to provide enough of these small polymers to satisfy the adsorptive powers of the pigment. If too high a pigment: resin ratio obtains pigment flocculation may occur. Very highly bodied alkyds should not be used as dispersing media otherwise gelation of the resin may occur. It is noted that there is a striking resemblance between the curves showing the relation between gloss and alkyd: amino ratio, and electro-kinetic or ζ -potential curves.

J.W.D.

PATENTS

Carbon Paper Inks

Moore Business Forms USP 2,866,711

The antistick properties of carbon paper inks are much improved by addition of a silicone.

C.O.C.

Preventing Bronzing of Heatset Printing Inks and Pigment Pastes

Sterling Drug USP 2,865,771

A mixture of the lead salt of 2,4,5,7-tetrabromo-3,6-fluorandiols and 1-10% (on the weight of the lead salt) each of a rosin amine and C.I. Mordant Red 9, C.I. Acid Violet 30 or a halogenofluorescein, e.g. 2,4,5,7-tetrabromo-12,13,14,15-tetrachloro-3,6-fluorandiols, added to heat-set printing inks prevents bronzing.

C.O.C.

Barium Borates as Antiseptic and Dirt-resisting Agents for Use in Paints

Buckman Laboratories BP 813,228

Addition of a barium borate containing 52.4-68.8% of BaO by weight of the anhydrous borate to paint results in coatings of improved mould resistance and which do not rapidly collect dust. With paints containing white pigments particularly TiO_2 (C.I. Pigment White 6) addition of the borate imparts increased resistance to

chalking. There is no increase in the susceptibility to iron staining and drying time and adhesion are little affected.

C.O.C.

Air-drying Wrinkle Coating Composition containing Epoxy Resin Esters

Midland Chemical Corp. USP 2,867,591

An epoxy resin is partly esterified with a drying oil fatty acid. The product after addition of thinners and driers is mixed with amines, preferably polyfunctional amine catalysts. Coatings formed from this mixture dry at 70-74°F. to a tough film having a wrinkle texture.

C.O.C.

Crackle Finish

American-Marietta Co. USP 2,866,720

An "alligator" finish is produced by first applying a pigmented thermosetting resin enamel base in a volatile organic solvent. The solvent is allowed to evaporate until the resin is in an immobile solvent-wet condition in which it is not effected by further application of organic solvent. The coating is then sprayed with a light-stable, thermoplastic, low water-absorptive synthetic film-forming polymer dissolved in a volatile organic solvent. Stoving then unites the two coatings and anchors them firmly to the substrate.

C.O.C.

Polymers of Amides of Vinyl Ethers containing Hydroxyl Groups—Water-based Emulsion Paints

Rohm & Haas Co. BP 812,158

The water-soluble products obtained by polymerising compounds of formula $\text{CH}_2=\text{CHOANR}^1\text{COR}^2$ (A = alkylene of 2-18 C of which at least two in a chain separate the adjoining N and O atoms; R^1 = H, phenyl, tolyl, benzyl, cyclohexyl or Alk of 1-18 C; R^2 = a $\text{C}_1\text{-C}_{17}$ mono- or polyhydroxy aliphatic or cycloaliphatic group which may be substituted by one or more Ar groups), e.g. $\text{CH}_2=\text{CHOCH}_2\text{CH}_2\text{NH}_2$, added to water-based emulsion paints, e.g. emulsions of poly(vinyl acetate) or polyacrylates, improve their brushing properties. They also impart better "wet edge" characteristics so that the paints can be applied to an adjoining area after a reasonable period with less risk of lifting the previously applied coating or excessive thickness where the edges overlap.

C.O.C.

Colour System for Matching and Compounding Colours

Pittsburgh Plate Glass Co. USP 2,866,277

A chart useful for matching and compounding colours in paints and inks which colours are shades, tints and values of a common hue consists of an odd number of chips showing a series of grey values of varying saturation arranged along an arc of a circle so that they progressively vary in uniform increments from one end of the arc to the other. An odd number of such arcs of progressively increasing diameter are placed concentrically about a central chip of the hue so that chips of like grey value on all of the arcs lie along common radii and the saturation of the chips from one arc to the next vary in uniform increments. The inner chip which gives the hue may be regarded as constituting a circle. In that case an outer arc of grey values obtained by mixing white and black alone or white and the complement of the hue in uniformly increasing increments corresponding to the grey value of the chips of the hue are added. At one end of this arc is placed a chip of the selected white and at the other end a chip of the black or of the complement of the hue. These chips are disposed upon radii at the extremities of the arcs and the chips thereupon give respectively tints and shades of the hue. A sample can be quickly and systematically compared with this chart to obtain the closest proximation thereof available on the chips of the chart. If it falls between two chips its composition in terms of amount of hue, tinting agent and greying agent can be quickly calculated as an average of those of the chips on either side. The chips it falls between may either be in a common arc and so be variations in grey value of a predetermined saturation or on a common radius and so be variations in saturation values of colours having a common grey value.

C.O.C.

VI—FIBRES; YARNS; FABRICS**Chemicals for Non-woven Fabrics**

J. T. Taylor

Amer. Dyestuff Rep., 48, 49-53 (9 March 1959)

Properties of non-woven fabrics are dependent upon the constituent fibre, the binder, the balance between

them, the distribution of the binder and the combination of the binder with the fibre. The most important polymers used are nitrile rubbers, acrylic esters, polyvinyl chloride, polyvinyl acetate, and GRS (butadiene styrene copolymers). Polymers may be applied from an emulsion or from a solution in an organic solvent. In the emulsion technique the particle size of the polymer emulsion, the drying temperature, the density and thickness of the web, and the concentration of the application bath are all important factors in the distribution of the polymer. The choice of monomer and the molecular weight of the polymer are important factors in determining the properties of the fabric. In general, homopolymers alone have not sufficient wet fastness and copolymers are essential. The proportion and distribution of the monomers in the copolymer is important. Often thermoplastic polymers do not give adequate durability and thermosetting resins, which may crosslink with the polymer or the fibre, are incorporated in the binder. The three principal thermosetting resins employed are melamine formaldehyde, methoxylated urea formaldehyde and ethylene urea formaldehyde, though epoxy and triazone resins are also applicable. As with the thermoplastic polymers the properties required in the fabric determine which and how much resin shall be used.

W.P.M.

Polyvinyl Chloride Fibres

E. Frieser *Textil-Rund.*, 14, 1-16 (Jan. 1959)
A review of properties in comparison with other fully synthetic fibres. A number of methods for the analysis of mixtures are given.

S.R.C.

PATENTS

Modified Viscose Fibres

Courtaulds *BP* 812,365
Regenerated cellulose fibres having a thick skin and non-crenulated surface are produced by spinning viscose containing 0.02-0.5% of a condensation product of ethylene diamine, propylene oxide and ethylene oxide into a coagulating bath containing sulphuric acid and zinc sulphate.

W.G.C.

Acrylic Fibres with Improved Dyeing Properties

Montecatini *BP* 812,370
Fibres made of polyacrylonitrile and binary copolymer of an allyl alcohol with a vinyl pyridine can be dyed with vat and disperse dyes as well as acid dyes.

W.G.C.

Fibres from Aromatic Copolyesters

Kokoku Rayon & Pulp Co. *BP* 813,239
Polyester fibres of good resistance to hot water are obtained by melt spinning copolymers of 3-methoxy-4-(β -hydroxy-ethoxy)benzoic acid and 4-(β -hydroxy-ethoxy)benzoic acid in ratios between 3:2 and 1:4.

W.G.C.

Brightening of Aromatic Polyesters

ICI *BP* 813,093
A fluorescent brightening agent is added during the manufacture of the polymer. Thus dimethyl terephthalate (100 parts) and ethylene glycol (63) are melted under deoxidised nitrogen. At 150°C. Zn acetate (0.015) and Sb_2O_3 (0.02) dissolved in ethylene glycol (1) are added. Ester-interchange is carried out at 160-215°C. under atmospheric pressure and, the methanol liberated being distilled off, this reaction is completed in 2 hr. The resulting bis-(β -hydroxyethyl)terephthalate is placed in a stainless steel vessel together with TiO_2 (0.5) as delustrant and Tinopal E conc. (C.I. Fluorescent Brightening Agent 72) (0.05). Polycondensation is carried out under 0.3 mm. mercury for 4 hr. This yields polyethylene terephthalate of intrinsic viscosity 0.65 (1%-chlorophenol at 25°C.) and of excellent whiteness.

C.O.C.

Artificial Fibres having a Wool-like Scaly Appearance

Rohm & Haas Co. *USP* 2,866,256
When rapid fluctuations in pressure are imposed on a thixotropic spinning solution during its extrusion through a spinneret into a coagulating bath the diameter of each fibre-forming stream emerging from an orifice is suddenly enlarged on each increase in pressure but decreases only gradually during each intervening decrease in pressure. This results in fibres which resemble a succession of cones each with its apex inserted into the base of the preceding one.

C.O.C.

Acrylonitrile Fibres having Good Affinity for Acid Dyes

Chemstrand Corp. *USP* 2,867,602
Copolymers of acrylonitrile and 1-15% of certain *N*-heterocyclic nitrogen compounds, e.g. 2-alkyloxymethylimidazole, are readily made into fibres having an affinity for acid dyes comparable with or superior to that of wool.

C.O.C.

Polyacrylonitrile Fibres containing Colloidal Aluminium and Silicon Oxides

Eastman Kodak Co. *USP* 2,865,880
When acrylonitrile is polymerised in an aqueous suspension of freshly precipitated mixed aluminium and silicon oxides, these oxides retain their colloidal form and activity through the processes of isolating, dissolving, and spinning the polymer. Polyacrylonitrile fibres containing 8-15% of the colloidal oxides are dyed deeply by ordinary methods of application by disperse, acid, vat, and some mordant dyes. In addition, presence of the oxides raises the safe ironing temperature by 20-30°C.

C.O.C.

Acrylonitrile Fibres yielding Solid Dyeings when Blended with Cellulosic Fibres

Dow Chemical Co. *BP* 812,535
Blends of cotton and/or viscose rayon with acrylonitrile fibres containing > 20% of a vinyl lactam polymer, e.g. polyvinylpyrrolidone, yield solid dyeings with vat, direct, sulphur, and azoic dyes.

C.O.C.

Chlorotrifluoroethylene Fibres

General Electric Co. *USP* 2,867,495
Fine denier fibres of appreciable tensile strength are obtained by the extrusion of a hot solution of a chlorotrifluoroethylene homopolymer. The solvent should be a liquid, CCl_4 being preferred, and the solution should be heated to a temperature as high as possible without causing decomposition of the polymer.

C.O.C.

Dyed and Durably Crimped Linear Polyester Fibres (VIII p. 404)

Cross-linking of Polyamides by Radiation (XIII p. 407)

VII—DESIZING; SCOURING; CARBONISING; BLEACHING

Solubilisation of Water by Cationic Detergents

S. R. Palit, V. A. Moghe, and B. Biswas
Trans. Faraday Soc., 55, 463-476 (March 1959)
Solubilisation of water in a number of water-immiscible organic liquids by eight cationic detergents is studied. The liquids are classified into two types: potential formers of water-in-oil or oil-in-water emulsions. Solubilisation increases considerably in mixtures of the two types, but no such increase is observed with mixtures of liquids of the same type. Solubilisation involves a number of phase transitions, and liquid crystalline phases are formed. The properties of these phases are discussed, and a complete three-component phase diagram of a typical system is given.

W.R.M.

PATENTS

Delignification and/or Bleaching of Cellulosic Pulp Société pour l'Amélioration et le Développement des Procédés Industriels "Sadepi"

BP 812,144
The pulp is treated with > 15% by weight of the dry fibres of an alkali metal or alkaline earth chlorate in presence of sufficient acid to bring the solution to pH 1.5-2.5 and an agent which promotes oxidation of the fibres, a mixture of V and Sn salts being especially suitable for this purpose. This oxidation promoting agent may act solely as a catalyst or may act as an intermediary in the chemical transference of oxygen from the chlorate to the fibres.

C.O.C.

Treating Cellulosic Fibres and their Blends with Other Fibres with an Inorganic Peroxid before Bleaching or Dyeing

Laporte Chemicals *BP* 812,752
Unscoured cellulosic fibres or their blends with other fibres are treated with an aqueous inorganic peracid at pH < 7 and 15-80°C. This treatment enables hot alkaline scouring to be dispensed with.

C.O.C.

Continuous Bleaching of Cellulosic Textiles

ICI BP 812,893

A full white cloth of good absorbency is obtained by use of a single acid-chlorite steaming process if the cloth is first dewaxed and desized by treating with hot trichloroethylene or perchloroethylene, flashing off entrained solvent and desizing with an aqueous peroxygen compound followed by steaming. C.O.C.

Degreasing and Dewaxing of Vegetable Fibres

ICI BP 812,894

Use of hot trichloro- or perchloroethylene as solvent enables rapid removal of 80-90% of the fatty and waxy matters present. Thus unbleached cotton cloth is continuously passed at open width through trichloro- or perchloroethylene maintained at $\leq 80^\circ\text{C}$. and kept in a series of baths through which the solvent flows counter current to the cloth. The cloth is in the solvent or solvent vapour for 10-60 sec., excess solvent is removed from the cloth which is then passed into water at $\leq 73^\circ\text{C}$. in the case of trichloroethylene and $\leq 86^\circ\text{C}$. in the case of perchloroethylene to remove the solvent. Suitable apparatus is described in BP 773,968 (J.S.D.C., 73, 438 (1957)). Complete removal of solvent is very rapid, taking only 8-60 sec. The cloth is then ready for drying or further processing. C.O.C.

Linearity of Log (Solubilisation)-Log (Concentration)

Function in Micellar Solubilisation (VIII this page)

Simultaneous Scouring and Dyeing of Viscose Rayon Fabric (VIII this page)

VIII—DYEING**Dyeing Processes and Molecular Configuration**H. Zollinger *Textil-Rund.*, 14, 113-125 (March 1959)

A discussion of steric influences on dye fastness, substantivity, and the adsorption of reactive dyes. S.R.C.

Linearity of Log (Solubilisation)-Log (Concentration) Function in Micellar Solubilisation

A. M. Mankowich

J. Colloid Sci., 14, 131-134 (April 1959)

Slopes of linear log (micellar solubilisation)-log (concentration) plots for three related phenylazonaphthol dyes in aqueous solutions of five types of surfactants were approximately parallel and varied with the dye. No correlation of polarity of dye with slope or magnitude of solubilisation was found. W.R.M.

Calculating Recipes for Shade MatchingM. V. Parfysheva *Tekstil. prom.*, 18, 38-40 (Dec. 1958)

Dyeing recipes (mixture of 3 acid dyes) for matching given shades on wool fabrics are calculated by obtaining the reflectance curves for each dyestuff and a mixture of the three, determining the absorption coefficients by Kubelka and Munk's formula, and finally calculating dyestuff concentrations mathematically. A fairly detailed mathematical treatment is given. G.J.K.

Faulty Dyeing of Mercerised Cotton YarnN. Bigler *S.V.F. Fachorgan.*, 14, 81-84 (Feb. 1959)

An account is given of a laboratory investigation into the nature of variation in lustre along the dyed mercerised cotton yarn. Finding no difference in the degree of mercerisation, the author compared impressions in gelatin of fibres taken from the normal and faulty parts of yarn and found a deposit on the less lustrous fibres which on subsequent examination proved to contain calcium. Presence of lime soap was inferred. 7 photomicrographs are included in the text. L.A.T.

Dyeing of Fabrics with Basic Dyes

V. E. Rostovtsev

Tekstil. prom., 18, 41-44 (March 1958)

A recipe for dyeing cotton fabric (bleached mercerised satin) with basic dyes, based on the use of Azotol KhA (C.I. 37531), is given, and good fastness to wet treatment is claimed. The fastness to light can be improved by impregnating the dyed fabric with a soln. of phosphomolybdic acid (10 g. per litre, acidity not exceeding 0.75 g. per litre) and subsequent drying. G.J.K.

Simultaneous Scouring and Dyeing of Viscose Rayon Fabric

M. M. Gershov and L. M. Avgustaitis

Tekstil. prom., 19, 37 (March 1959)

Viscose rayon fabric is run (in rope form) into a cold dyebath containing sodium silicate and OP-10 preparation (emulsifying agent), the dye being dissolved with soda ash and strained separately. Initial dyeing is too slow to cause unevenness during the filling of the machine (30 min.). Dyeing is then carried out normally, raising the temp. gradually to 90°C . and maintaining it for 45-60 min. The advantages claimed are decreased liquor ratio, increased capacity and saving in labour and materials. G.J.K.

Control of Sodium Hydrosulphite in Vat DyeingS. Hafenrichter *Textil Praxis*, 14, 168-174 (Feb. 1959)

In vat dyeing, the most important information required for control of the hydrosulphite is the rate at which it must be replaced to maintain the optimum concentration of the reducing agent. Under practical conditions the rate of oxidation of the hydrosulphite is proportional to the area of the surface exposed to air, and increases rapidly with temperature. These factors are initially determined by trial dyeings, from which the hydrosulphite requirements are calculated for a given dyeing system. L.A.T.

Vat Dyeing with Sodium Formaldehyde-sulphoxylateN. A. Shubina *Tekstil. prom.*, 18, 53-54 (Dec. 1958)

The advantages of Rongalite over hydrosulphite in vat dyeing of cotton yarn are higher dyeing temp. ($90-95^\circ\text{C}$.) and thus elimination of initial scouring, greater colour yield because of improved reduction of dye, fuller and more level dyeings, and improved spinning properties. G.J.K.

Alcian Dyes in Dyeing and Printing

A. S. Stepanov, A. G. Barinova, and T. D. Balashova

Tekstil. prom., 19, 31-37 (March 1959)**Dyeing Animal Fibres with Nitroso Compounds**C. Weimann *Teintex*, 23, 773-781 (Nov. 58)

A discussion of Russian Patent No. 95,997 (Mikhailenko and Ryibkind) by which wool-silk is dyed with an intermediate from an acid bath, NO groups are introduced into the product, and finally a metal complex into which the keratin or fibroin enters is formed by reaction with suitable metal salts of Cr, Fe, Cu, Co, and Ni. The process has reached the production stage in the U.S.S.R. and offers a full range of hues. Cf. J.S.D.C., 74, 718 (1958). S.R.C.

Dyeing of Wool pretreated to produce Contrast Effects

W. Postman

Amer. Dyestuff Rep., 48, 43-47 (23 Feb. 1959)

Wool is pretreated in an acid bath with a colourless compound (e.g. a condensate of formaldehyde and a naphthalene sulphonic acid). Two samples of wool, one treated as above and one untreated, can be dyed together in an acid dyebath containing two selected dyestuffs, in such a manner that the two samples are dyed different colours. During the dyeing, one of the two dyestuffs in the bath dyes both the treated and untreated samples of wool; the second dyestuff is absorbed preferentially by the untreated sample. The pretreating agent leaves the wool and enters the dyebath; this is a reversible process and some of the agent in the bath then returns to the wool. The uptake of dyestuff from the bath can be correlated with the removal of pretreating agent from the wool. W.P.M.

Azoic Dyeing of Hydrophobic Synthetic Fibres

R. Löwenfeld

Melliand Textilber., 40, 295-300 (March 1959)

The author discusses azoic dyeing techniques. The modified azo process involving diazotisation and coupling on the fibre is typified by Intramin (FH) dyes, highly suitable for polyester fabrics, secondary cellulose acetate, and cellulose triacetate, suitable in part for Acrilan, Perlon, nylon, Rilsan, and polyvinyl alcohol fibres, and unsuitable for Dralon, Orlon, and polyvinyl chloride fibres. The Ofna-perl (FH) process, involving the application of naphthols and diazonium salts stabilised by combination with secondary amines, and subsequent

acid development, is highly suitable for Perlon, nylon, and polyvinyl alcohol fibres, suitable in certain instances for Acrilan and—to a lesser extent—for secondary cellulose acetate, and unsuitable or not recommended for cellulose triacetate, polyester, and polyvinylchloride fibres, Dralon, Orlon, and Rilsan. Practical processes are outlined, and dyes and combinations particularly suited for each fibre are listed. Light fastness of Naphthol AS-OL ← Fast Red B is 3 on Orlon 51, 3-4 on Acrilan, 5-6 on dynel. Despite high wet fastness Ofna-perl dyeings are claimed to cover irregularities in nylon better than acid or metal-complex dyes. Such dyeings resist dry heat setting at 200°C., whereas only 8 listed combinations do not migrate to the fibre surface in the course of fixation with saturated steam at 130°C. There are 16 references. S.M.J.

Physical and Kinetic Aspects of Carrier Dyeing

H. Zukriegel and F. Eichler

S.V.F. Fachorgan, 14, 58-60 (Feb. 1959)

It is postulated that the carrier is adsorbed, forming a layer about 100 Å. thick round the fibre. The concentration of the dye is said to be higher in the carrier phase than in the dyebath and is accompanied by disaggregation of dye molecules. Consequently the osmotic pressure between the dye and fibre surface is raised and the interfacial tension between the carrier and the fibre is lowered. During the course of dyeing the dye molecules enter the fibre through the carrier phase, and the partition ratio of the dye between the carrier and aqueous phase is disturbed. To restore the balance, more dye is transferred into the carrier phase. This process of continuous partition of dye between the two phases takes place rapidly resulting in a much shorter dyeing time. L.A.T.

High-temperature Dyeing of Synthetic Fibres

H. Stern *S.V.F. Fachorgan*, 14, 122-129 (March 1959)

Various types of machinery suitable for dyeing loose stock, yarns, and fabrics at temp. > 100°C. are briefly referred to and illustrated. Benninger's pressurised jigger and Konrad Peter's continuous ribbon dyeing unit have fuller description. Advantages of high-temperature dyeing of synthetics include shorter dyeing time, better penetration, and in some cases improved fastness. L.A.T.

Dyeing of Dralon with Astrazon (FBY) Dyes

W. Beckmann

S.V.F. Fachorgan, 14, 130-137 (March 1959)

Basic dyes are chemically bound to acidic groups of polyacrylonitrile fibres—hence the outstanding washing fastness of this class of dyes. The saturation values of individual dyes, applied singly or in mixtures, are calculable. For deep shades dyes of high tinctorial value are suitable. Dyes with lower strike and good levelling properties should be used for pastel shades. Levagal PAN (FBY), a cationic product, is a valuable retarding agent. The problem of compatibility of Astrazon dyes in mixtures has been investigated and useful working parameters are given. L.A.T.

Finishing and Dyeing of Fibreglass Drapery Fabrics

R. C. Horton

Amer. Dyestuff Rep., 48, 48-49 (23 Feb. 1959)

Fibreglass drapery fabrics are finished by passing the greige fabric through an oven maintained at 1200°F. and then through a pad dyeing system. The intense heat of the first step removes all organic size on the glass and softens the glass giving the weave a permanent set and making the fabric permanently crease-resistant. The fabric passes from the thermal scour into a finishing bath in which resins and pigments are applied. This step is followed by a cure and an aftertreatment to give water repellency and wash fastness. Two new developments have enabled multicolour effects to be obtained; one depends upon the selective capillarity of various glass fibre yarn forms and the other involves the use of yarns which have been dyed with inorganic pigments capable of withstanding the high temperatures of the glass-finishing process. W.P.M.

PATENTS

Metallising Azoic Dyeings

General Aniline

USP 2,867,494

Dyeings made with azoic dyes containing no solubilising groups and capable of forming metal complexes have

improved fastness to light, washing and chlorine if coupling is carried out in presence of a metallising agent. Thus cotton was padded with an aqueous solution of 3-hydroxy-2-naphthoic acid anilide and copper chloride and then with an aqueous solution of the $ZnCl_2$ salt of tetrazotised dianisidine. Finally it was steamed. The resulting dyeing was somewhat redder than that obtained in absence of $CuCl_2$ but had considerably better fastness to light, washing, and chlorine. C.O.C.

Dyeing Wool with Vat Dyes

U.S. Secretary of the Army

USP 2,857,235

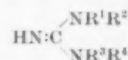
Heavy dyeings are obtained on wool with anthraquinone vat dyes by using a vat at pH 12-8-13-1 and 120-160°F., the time of immersion being < 1 min. No damage to the fibre occurs if it is neutralised immediately it leaves the vat. The process is particularly applicable in top dyeing. Thus the wool is led into a vat maintained at pH 12-9 and 155°F. in which it is treated for 25 sec. and then led into a bath of 2% acetic acid and 2% ammonia at 75°F. The vat is made up of C.I. Solubilised Vat Black 25, C.I. Solubilised Vat Green 3, and C.I. Vat Orange 11, the dye mixture and the reducing solution (sodium hydrosulphite and caustic soda) being run into a replenishing tank separately and continuously at a rate sufficient to maintain the vat in correct condition. C.O.C.

Dyeing Proteinaceous and Nylon Fibres

Deering Milliken Research Corp.

BP 812,852

Level dyeings are obtained with high affinity milling dyes, even under exceedingly adverse conditions, if a compound of formula—



(R^1 , R^2 , and R^3 = same or different, H, monocyclic aromatic radical, aliphatic radical or cycloalkyl; R^4 = monocyclic aromatic, aliphatic or cycloalkyl radical) or an acid addition salt of such compound is present in the dyebath. Thus a blend of chlorinated wool and nylon is entered into water at 80°F. and a sym-diphenylguanidine (0.5 lb. per 100 lb. fibres) dissolved in sulphonated caustic oil slowly added together with an alkylaryl polyester sulphate dispersing agent. This brings the bath to pH 7-6. After 10 min. and with the bath still at 80°F. C.I. Acid Blue 90 is added and the bath brought to the boil in 1 hr. At the boil the pH is 7-8.5. After 40 min. at the boil the steam is cut off, acetic acid added very slowly and the bath kept at the boil for 20 min. The bath has now pH 5-2. Satisfactory exhaustion is obtained and the goods are dyed a level and solid bright blue. C.O.C.

Dyed Effects resembling Prints on Cellulose Acetate

Bradford Dyers' Assocn.

BP 812,697

The cloth is subjected to local pressure, e.g. by passing through a hot embossing calender. On being dyed the pressed portions of the cloth are dyed to a different depth from the other portions. Dyeing is preferably carried out on the pad and it is also preferable to treat the cloth with a swelling agent either between the pressure treatment and dyeing or during dyeing. The application of a swelling agent not only affects the differential dyeing effect obtained but also may cause the unpressed areas to shrink with consequent crinkling or puckering of the pressed areas. Two-coloured effects may be obtained by use of dyes from the same or different baths which respond differently to the material which has been pressed. Thus an acetate crepe cloth is calendered at 165°C. between an 8 in. engraved steel bowl and a woolen paper bowl, the pressure being 2,100 lb. over the face of the bowls. On being padded with a cold aqueous dispersion containing 1-methylamino-4-ethylaminomethanthraquinone, Lissapol N (ICI) and sodium alginate, steamed and soaped, a light coloured design (formed by the pressed portions of the cloth) on a deep blue background is obtained. Cloth similarly calendered, padded with an aqueous solution of Naphthalene Scarlet 4RS (C.I. Acid Red 18) and isopropyl alcohol, cured for 2 min., rinsed in cold water and soaped for 15 min. at 60°C., has a sharp red design (formed by the pressed portions of the cloth) on a lightly tinted background. C.O.C.

Dyed and Durably Crimped Linear Polyester Fibres

FH BP 812,362
Polyester filaments before, after and while they are being formed into a tow are impregnated with an aqueous dispersion of a dye having affinity for them. The dye is preferably either a disperse dye or a water-soluble developable derivative of a water-insoluble dye. Excess liquor is squeezed out and the filaments if not already oriented are stretched, dried, mechanically crimped and finally steamed to fix the dye and set the crimp.
C.O.C.

Treating Cellulosic Fibres and their Blends with Other Fibres with an Inorganic Peracid before Bleaching or Dyeing (VII p. 401)

Modern Finishes for Modern Fabrics—Effect of Resin Finishes on Light Fastness of Cibacron Dyes (X this page)

IX—PRINTING**Christoph Philipp Oberkampff—a Colourist and Employer of the Eighteenth Century**

W. Gellendien
S.V.F. *Fachorgan*, 14, 86–100 (Feb. 1959)
A historical sketch tracing the development of fabric printing from antiquity to the times of C. P. Oberkampff (1738–1815), an eminent colourist and entrepreneur who in 1760 established a calico printing business in a Paris suburb, Jouy, soon employing 1500 people. Oberkampff's gifts were not only technical—his organising and business ability were outstanding. Loved by his workers, Oberkampff was a true leader in an industry which owes so much to his pioneering spirit. He introduced mechanisation and roller printing into his works. In co-operation with Berthollet and Widmer, discharge printing and chlorine bleaching were developed, which gave further stimulus to his famous fast blue prints on a white background. In 1780 there were 300 calico printing firms in France employing 300,000 people. The French Revolution brought a number of setbacks, but a revival followed when Napoleon came to power. Bonaparte's appreciation of Oberkampff's contribution to the industry was expressed by the emperor's personal visit to the printing works and a decoration—the Cross of the Legion of Honour. The eclipse of Napoleon and the allied occupation of Paris brought also an end to Oberkampff's venture. He died on 4th October 1815 at the age of 77.
L.A.T.

Electronic Engraving of Printing Rollers

A. A. Sokolov and S. V. Pantyushin
Tekstil. prom., 18, 41–42 (Dec. 1958)
An experimental model for the engraving of copper rollers by an electronic device is described. It is claimed that full tones (10 steps) and a complete reproduction can be obtained within a few hours.
G.J.K.

Hydrolysis and Ease of Removal of the Sodium Salts of Azoic Coupling Components from Cotton Fabrics

P. B. Morfyanov and B. N. Mel'nikov
Tekstil. prom., 19, 55–58 (Jan. 1959)
The ease of removal of excess Azotol (azoic coupling components) after printing is investigated. Five Azotol preparations are arranged in order of decreasing acid hydrolysis and this series is related directly to desorption. Temp. and alkalinity of the washing baths are important, the former being more effective.
G.J.K.

Discharge Printing of Polyester Fibres by the Thermosol Process

G. Bertolina and A. Broggi
Melliand Textilber., 40, 301–304 (March 1959)

White discharges can be obtained in screen printing with a paste of % composition—soluble zinc formaldehyde-sulphoxylate (I) 30, 1 : 2 Nafka gum 28, hydroquinone 5, glycerol 10, pentaerythritol 5, water 10, Remol TRF 10, Uvitex ER 2, aged for < 12 hr.—by continuous thermofixation, e.g. in a stenter, for 1–3 min. at 200°C. At this temp. glycerol appears to dissolve not only disperse dyes, but also I, unlike other discharge agents. The less watersol. hydroquinone and pentaerythritol have a similar effect and increase definition. In the absence of steam there are no halos. Detergent and

reducing aftertreatments are advocated. 9 suitable disperse ground shades are listed, as are also 32 vat dyes for coloured discharges in a slightly modified paste. Yields with the latter are sometimes higher than in direct printing, perhaps owing to fixation as vat acids of greater affinity.
S.M.J.

PATENTS**Laminated Printing Block**

H. Renck BP 813,180
A printing block which has good resilience combined with a hard, smooth and compact surface is produced by assembling an unvulcanised rubber support and a foil of thermoplastic synthetic resin, embossing and vulcanising the rubber block and re-cooling the synthetic resin outer face.
C.O.C.

Screen Printing

W. Balmer and J. U. Heron BP 813,112
The air in the immediate vicinity of the screen is charged with vapour to such a degree as to inhibit drying of the ink during the printing operation. This enables inks to be used which dry more rapidly than those hitherto generally used.
C.O.C.

Black Prints on Fibrous Materials

FH BP 812,143
Level, full, deep black prints are obtained by use of a paste containing an antiazo or hydrazine-sulphonic acid salt of a 4-amino-diphenylamine, which in addition to the NH₂ group may contain other substituents not imparting solubility in water (e.g. Na-4'-methoxydiphenylamine-4-antidiazosulphonate, Na-4'-methoxydiphenylamine-4-hydrazinesulphonate and Na diphenylamine-4-antidiazosulphonate), and 1,3,5-trihydroxybenzene. Steaming is preferably done with acid steam.
C.O.C.

Blue Print Paper Sized with Magnesium Hydroxide

W. C. Hamilton & Sons USP 2,866,707
Paper surface-sized with an aqueous dispersion containing magnesium hydroxide, glue, and formaldehyde and then treated with a light-sensitising solution of the blue print type, yields prints having a deep pure blue background against which the white lines are exceedingly sharp.
C.O.C.

Transfers for Ceramics

S. W. Cox BP 812,814
The transfer is first applied by pressure at room temperature to a transfer receiving material made by coating a flexible base, e.g. thin permeable tissue paper, with a synthetic hydrophilic wax. This intermediate receiving material is then applied to the article to be decorated and on being wetted the tissue backing is readily removed leaving the colour in position ready for firing. This enables patterns having very fine details to be correctly reproduced.
C.O.C.

Alcian Dyes in Dyeing and Printing (VIII p. 402)

Modern Finishes for Modern Fabrics—Effect of Resin Finishes on Light Fastness of Cibacron Dyes (X this page)

X—SIZING AND FINISHING**Resin-treated Fabrics—Resin Site**

J. T. Marsh *Text. Manuf.*, 85, 35–39 (Jan. 1959)
A critical review (37 references) is given of the evidence confirming the early conclusion that optimum crease-resistance in fabrics treated with urea-formaldehyde resins is obtained when the resin is deposited within the fibre. Comment is made on the effect of degree of resin condensation on fibre penetration, the higher permeability of cotton compared with viscose rayon and on resin migration during drying of the impregnated fabric. The various staining techniques available for identifying the site of the resin within the fibre and the uniformity of application throughout the fabric are discussed. Difficulties in interpreting the results of staining tests are noted.
E.C.

Modern Finishes for Modern Fabrics—Effect of Resin Finishes on Light Fastness of Cibacron Dyes

S. N. Glarum
Amer. Dyestuff Rep., 48, 41–43 (9 March 1959)
The effects of the application of wash-and-wear finishes on the light fastness (Fade-Ometer) of the Cibacron reactive

dyes are discussed. The urea-formaldehyde and modified urea-formaldehyde resin finishes reduce the light fastness less than do the melamine-formaldehyde and ethylene-urea resins. The effects on light fastness of five commercial durable water-repellent finishes, an emulsifiable silicone, an alkylpyridinium compound, two modified resin emulsions, and a solid modified resin type, were also tested. Only the modified resin emulsion type reduced the light fastness to any significant extent (1-2 units reduction).

W.P.M.

Resin Finishing of Cotton Flannelette Shirting for Dimensional Stability

R. Steidl *Melliand Textilber.*, **40**, 305-307 (March 1959)

Six graphs and two tables show that two crease-resist resins, one more effectively, provide shrink resistance, especially when condensed, without appreciable reduction of tear strength and abrasion resistance, although "non-iron" effects are not obtained with these resins at the concentrations used.

S.M.J.

Development of a Wash-Wear Finish

H. B. Goldstein

Amer. Dyestuff Rep., **48**, 44-48 and 55 (9 March 1959)

The requirements of wash-wear finishes on cotton, the modifications of the properties of cotton necessary to obtain them and the undesirable properties of finishes produced with the aid of such materials as urea-formaldehyde resins, are discussed. The development of triazones as agents for the production of wash and wear finishes, their application, and the properties of the finished material are described. Selected triazones give excellent wash and wear properties, the relationship between tensile strength and crease resistance is usually more favourable than with the other available resins and the finishes show no chlorine damage on the initially-treated fabric or after alkaline laundering or acid souring.

W.P.M.

Reaction of Formals and Polyformals with Cellulose

B. H. Kress

Amer. Dyestuff Rep., **48**, 33-36 (23 Feb. 1959)

The application of acetals and polyacetals of formaldehyde and various alcohols (known as formals and polyformals) to cotton, viscose rayon, and paper under varying conditions using various acid catalysts are described and the effects of the treatment are evaluated. Acetals in presence of acid catalysts interact with cellulose to yield products containing firmly-bound formaldehyde. Simple acetals are not as efficient as polyformals (e.g. polyformals of diethylene glycol) in modifying the properties of cellulose. Catalysts such as aluminium salts and magnesium chloride promote reaction without undue loss in tensile strength of the fabric. The polyformal treatment reduces swelling of viscose in water, fabric shrinkage and receptivity for direct cotton dyes and enhances crease recovery somewhat. It is suggested that transacetalisation probably occurs as a result of such treatment.

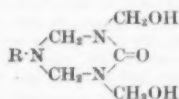
W.P.M.

Imparting Wrinkle Resistance to Cotton Fabrics with Triazone Derivatives

J. D. Reid, J. G. Frick, R. M. Reinhardt, and R. L. Arceneaux

Amer. Dyestuff Rep., **48**, P 81-P 90 (9 Feb. 1959)

The history of triazonones (triazones) is reviewed. The preparation of 3 methylol derivatives of 5-substituted tetrahydrotriazinone—



and their application to cotton, by conventional methods, as agents for the achievement of "wrinkle"-resistant finishes, is described. The properties of the finished materials are compared with five normal commercial finishes including urea formaldehyde and dimethylol ethylene urea. No objectionable odour develops if the goods finished with triazones are washed after treatment. The textile properties of the finishes are similar to and the resistance to hypochlorite bleaching and removal by acids are superior to, other good crease-resistant finishes.

W.P.M.

Flameproofing Native and Regenerated Cellulose

E. Frieser

Melliand Textilber., **39**, 795-800 (July); 1034-1037 (Sept. 1958)

A review with 69 references. Reaction products of the thermal decomposition of cellulose, their heats of combustion, and relative reaction rates and activation energies of different forms of cellulose are tabulated. A graph relates time, temperature, and amount and type of decomposition products. Treatments discussed include titanium and antimony chlorides and oxides, phosphorus-ammonia compounds and polymers, phosphates of zinc and boron, sulphamates, sodium silicate, bromoform-triallyl phosphate, phosphonitrilates, tetrakis(hydroxymethyl)phosphonium chloride alone and combined with other agents, urea-phosphoric acid, organic phosphates, chlorinated paraffins, and organic silicates. Theories of flameproofing and application problems are also summarised.

S.M.J.

Improving the Handle of Dacron Fabrics

P. N. LaGasse and A. R. Taylor

Amer. Dyestuff Rep., **48**, 77-80 (9 Feb. 1959)

A new process (the C.H.C. process) is described for improving the visual and tactile properties of Dacron polyester fibre. The fabric is prescourd, calendered at 10-20 tons pressure, 200-350°F., 15-20 yd./min. (one pass on each side), heat-set, and then treated in 3% NaOH soln. Treatment is started at room temperature, and the temperature raised to 210-212°F., which is then maintained for 30 min. After cooling to 160°F. during 20 min., the material is rinsed in water, in acid and finally in water. Calendering flattens yarn bundles and reduces the thickness of the fabric, the surface appears to be plasticised, and many filaments are deformed and have sharp edges. Caustic soda treatment removes the plastic-like fabric surface and improves liveliness and drape. The effect of heat-setting on shrinkage of Dacron during subsequent exposure in air at high temperature and breaking tenacity after various treatments in caustic soda are illustrated graphically.

W.P.M.

Influence of Finishes on the Properties of Fibreglass Tapes and Fabrics

E. L. Lotz *Amer. Dyestuff Rep.*, **48**, 50-52 (23 Feb. 1959)

During the manufacture of glass fibre binders and warp sizes are applied. These may impair the physical properties of the material and may have to be removed and another finish applied. The methods of removal of these binders and warp sizes and the application of the final finishes and their influence on the physical and electrical properties of the fabrics are described.

W.P.M.

PATENTS

Flame-resisting Finishing

Victor Chemical Works

USP 2,867,547

USP 2,867,597

Cellulosic fabric is made flame-resisting by treating it with incompletely polymerised dialkyl-β-carboxyalkyl alkane phosphonate and then baking to complete polymerisation of the ester and bind it to the fibres. Thus diallyl-β-carboxymethyl propane phosphonate was dissolved in Chlorox (ββ'-dichloroethyl ether) and treated in absence of O at 100°C., using a benzoyl peroxide catalyst, until its viscosity (measured by the discharge time from a 5 ml. pipette) was 3-4 times that at the start. It was then cooled in an ice bath and the incompletely polymerised ester separated from solution by addition of a large volume of hexane. This polymer was dissolved in a 30:70 mixture of methanol and ethylene dichloride to a 22% solution. Cotton cloth was immersed in this solution for 5 min., squeezed, dried, and baked for 30 min. at 100-108°C. The treated cloth had good flame-resistance.

USP 2,867,548

Similar use is made of the diallyl and dimethylal esters of β-cyano ethane phosphonate. If desired the incompletely polymerised ester may be brominated before it is applied to the material to be rendered flame-resistant. Such bromination enables the final amount of polymerisation to be controlled.

C.O.C.

Increasing the Wettability of Nylon

Ions Exchange & Chemical Corp.

BP 812,460

The wettability of nylon is increased by boiling it for 24 hr. in 2-5% aq. KOH.

C.O.C.

Treating Heat-set Nylon Fabric with Swelling Agents

Heberlein & Co. BP 813,289

The handle and appearance of heat-set nylon fabrics are improved by treatment with an aqueous solution of an inorganic swelling agent, the solution also containing \geq half its weight of an organic solvent which is at least partly soluble in water, rinsing and drying. Thus heat-set nylon batiste was treated for 6 sec. in a bath at 20°C. made up of 20-1st B₆. HCl (445 parts by wt.), water (525) and amyl alcohol (20). It was then thoroughly rinsed with cold water and dried under tension. The finished fabric was distinctly stiffened and had a matt appearance. C.O.C.

Coating Glass Fibre Rovings with Metal

Commonwealth Engineering Co. of Ohio BP 812,930

The rovings are heated and vibrated in an atmosphere of a gaseous compound which at the temperature employed decomposes to liberate free metal. This results in very uniform coating of the fibres with the metal. C.O.C.

Impregnation of Fibrous Materials with the Aid of a Radio-frequency Field

C. A. Baer USP 2,865,790

Fibrous material, e.g. a carded lap, impregnated with a bonding solution is exposed to a radio-frequency field between two electrodes. The polar reversal of this field (of e.g. 5-3000 million cycles per sec.) rotates the molecules of the solution and so breaks down the surface tension and viscosity of the solution. This causes (1) acceleration of the penetration of the solution and (2) a cumulative heating action uniformly throughout the material which sets the binder *in situ* to a solid consistency and so yields a product of improved tensile strength. C.O.C.

Finishing and Dyeing of Fibreglass Drapery Fabrics

(VIII p. 403)

Dyed and Durably Crimped Linear Polyester Fibres

(VIII p. 404)

Quantitative Measurement of Fabric Appearance—Practical Evaluation of Wash-and-wear Characteristics

(XIV p. 409)

Evaluation of the Effectiveness of Antibacterial Finishes for Cloth

(XIV p. 410)

Estimation of Washing Loss of Resin-treated Cellulose

(XIV p. 411)

XI—PAPER AND OTHER CELLULOSIC PRODUCTS

Homogeneity and Properties of Cellulose

B. A. Zakharov, V. I. Ivanov, G. A. Krýlova, and N. G. Vyunova Doklady Akad. Nauk S.S.S.R., 122, 814-816 (11 Oct. 1958)

Molecular homogeneity of cellulose is related to its properties, and it is claimed that the strength of cellulosic materials increases with increasing degree of homogeneity irrespective of the change of D.P. The synthetic fibre Meril (D.P. 450, breaking length 54 km.) is used as an illustration. G.J.K.

Chemical Homogenisation of Cellulose

V. I. Ivanov, B. A. Zakharov, G. A. Krýlova, and N. G. Vyunova Doklady Akad. Nauk S.S.S.R., 123, 691-692 (1 Dec. 1958)

Treatment of cotton and wood cellulose with dil. nitric or hydrochloric acid (0.2 N.) at 92°C. for 60 (cotton) and 30 (wood cellulose) min. produced a marked degree of homogenisation coupled with a decrease in the D.P. The distribution of mass for a given D.P. is determined on the basis of fractional sedimentation of cellulose trinitro ester; and D.P. by the viscosity of this ester in ethyl-acetate. Nitric acid gives a greater degree of homogenisation. G.J.K.

Properties and Nature of Surface of Cellulose. I—Theoretical and Experimental

K. Borzin Norsk Skogindustri, 13, 81-92 (March 1959)

The theories and methods of surface chemistry are discussed, terminology defined and various surface properties and parameters used in the study of wetting of solids are explained in detail, stressing the difference between surface and capillary wetting. Apparatus for determining contact angles between a variety of liquids and cellulose at R.H. 0-100% and 0-100°C. are described.

The experiments described were carried out with cellulose films pptd. from organic solvents. Part 2 will include studies on cellulose in contact with water. (In English.) R.A.

Carboxyl Groups and Cations as Factors affecting the Yellowing of Cellulose

N.-E. Virkola, Y. Hentola, and H. Sihtola

Paperi ja Puu, 40, 627-634 (Dec. 1958)

It has been confirmed that aldehydic carbonyls formed by periodic acid oxidation in carbon atoms C₂ and C₃ of anhydroglucose units cause yellowing of cellulose on heating and that the tendency to yellow increases with an increasing number of aldehyde groups. The tendency to yellow of dicarboxylcellulose obtained by further oxidation of periodate oxycellulose with NaClO₂ increases with increasing carboxyl content. The results show clearly that yellowing of a dicarboxylcellulose at 140°C. can be very strongly affected by a cation exchange, the yellowing of the sodium salt being much greater than that of the free acid forms of carboxyls. (In English.) R.A.

Production of Carboxymethylcellulose Fractions and Investigation of their Physico-chemical Properties

K. F. Zhigach, M. Z. Finkel'shtein, I. M. Timokhin, and A. I. Malinina Doklady Akad. Nauk S.S.S.R., 123, 289-291 (11 Nov. 1958)

Various samples of carboxymethylcellulose (CMC), taken from those used mainly as stabilisers in drilling of clay, have been investigated. These samples were shown to lack homogeneity and separation into fractions by stepwise deposition (e.g. with methanol) is carried out. The fractions so obtained contain a gel-like and sol-like phase and, again, these phases differ in viscosity, degree of polymerisation, degree of etherification and also loss of water on filtration. The less the degree of polymerisation, the greater the degree of etherification. In most of the samples taken, the gel-like phase had high viscosity, relatively low degree of etherification and an exceedingly high water loss. The properties of these fractions are related to their suitability for use as stabilisers and gumming agents. A table of properties is given. G.J.K.

Cellulose Nitrate of Low Degree of Substitution

G. A. Petropavlovskii and N. T. Nikitin

Zhur. priklad. khim., 31, 1862-1869 (Dec. 1958)

The nitration of cellulose with a mixed acid composed of H₂SO₄ 31-38%, HNO₃ 32%, and H₂O 37-32% at 30°C. results in the production of low substituted cellulose nitrate, which has the appearance of a white fibrous substance, with a degree of substitution $\gamma = 5-20$ and a D.P. of 300-750. It dissolves in 6% NaOH soln. forming a viscous, colourless soln. in which nitro groups are very little hydrolysed at room temp. Conc. NaOH shows an opposite effect on nitro groups. The nitration reaction does not oxidise cellulose, which is proved by the virtually unchanged number of carboxyl and aldehyde groups in the derivative, in which two-thirds of the primary alcoholic hydroxyls are replaced by the nitro radical. The viscous conc. soln. of the cellulose nitrate were used for the preparation of films, which are quite strong. Their hygroscopic and the water-absorption properties are similar to those of Cellophane. T.Z.W.

Nitrates of Dicarboxycellulose

N.-E. Virkola Paperi ja Puu, 40, 639-640 (Dec. 1958)

If the carboxyl content of dicarboxycelluloses exceeds a certain limit, nitrates from these dicarboxycelluloses become partly insol., for instance in acetone. This partial insolubility occurs especially when the carboxyl groups are in the acid form before nitration whereas it was not observed if the carboxyl groups were in the form of the sodium salt. This is explained by the fact that carboxyls in the state of the sodium salt cannot form cross-linkages as they do in the acid form. (In English.) R.A.

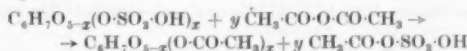
Reactions of Dextrin Sulphate

G. Ya. Lyandzberg

Zhur. priklad. khim., 31, 1900-1902 (Dec. 1958)

An aq. cellulose sulphate soln., prepared by the action of chlorosulphonic acid in dichloroethane at -3°C., can be used to activate cellulose, prior to its acetylation with acetic anhydride. The cellulose sulphate, precipitated from the reaction mixture with ether, when it comes down

as a white amorphous powder, is a dextrin (D.P. 6-100). On treatment, the molecules of the dextrin sulphate diffuse into the cellulose and then react with acetic anhydride—



where $x = 1-3$ and $y = 3$. The molecular changes taking place inside the fibre cause a break-up in the association of the cellulose macromolecules, thus weakening the hydrogen bonds between them. The reactivity of such a fibre, with separated macromolecules which are accessible to chemical action, increases many times, because of the ability of the macromolecules to take part in the direct reaction not only with acetic, but also with propionic and butyric anhydrides or their mixtures. T.Z.W.

PATENTS

Starch Phosphates—Sizes for Pulp and Paper

International Minerals & Chemical Corp. BP 812,339

Starch is treated in an aqueous solution of an alkali metal orthophosphate at pH 3.0-7.5 so that the starch incorporates the phosphate in amount equivalent to < 1% by weight of P. The unabsorbed liquid is removed from the starch which is then heated at 120-175°C. for 1-15 hr. The products form stable aqueous pastes which are much clearer than those obtained from untreated starch and which do not gel when kept. They are used as sizes for adding to the beater or for the surface finishing of paper. C.O.C.

Flame-resistant Finish for Paper

Albemarle Paper Manufacturing Co. USP 2,867,549

Paper treated with a rosin suspension containing water-soluble flameproofing salts in the aqueous phase has a substantial degree of fire resistance though it is subject to afterglow and so continues to smoulder. This defect can be eliminated by sizing the paper before the rosin dispersion is applied, the degree of sizing required being at least 7-8 sec. water resistance when tested by ASTM D779-54. C.O.C.

Water-resistant Coating Compositions for Paper

Oxford Paper Co. USP 2,865,773

Adding monomethylol dimethyl hydantoin as a "converting" or tanning agent to soyabean protein paper coating compositions, together with a cutting agent for the protein, e.g. ammonia, yields a composition for use in the production of machine-coated paper having extremely high resistance to water and improved properties for off-set printing. C.O.C.

Cast Coated Paper

S. D. Warren Co. BP 811,443

A high gloss, insolubilised, wet-rub resistant coating surface with high printing fidelity is obtained when the web is coated with a composition incorporating a product obtained by mixing a protein, e.g. casein, with water and a water-sol. amine, e.g. monoethanolamine, in an amount sufficient to maintain the finished coating at a pH of 7.3-9. After drying the paper is finished by passage through a pool of an aq. liquid, containing formaldehyde, in the nip between the coated surface and the highly-polished heated drum, the surface of which is also wetted by the pool. R.A.

Coated Paper

Kimberly-Clark Corp. USP 2,860,073

An insolubilising agent for the finish coating is incorporated in the undercoating. When the latter is dry, the finish coating comprising a mineral pigment and a protein binder is applied and the sheet held until the adhesive in the finish coating has become insolubilised. R.A.

Sized Filled Paper

S. D. Warren Co. BP 810,828

Finely-divided CaCO_3 is mixed with an aq. emulsion or dispersion of a water-repellent aliphatic ketene dimer which partially or totally coats the filler particles. Part of the dimer migrates to the cellulose fibres, providing a size. After mixing with dimer, but before addition of the filler mixture to the pulp, an aq. dispersion of manno-galactan is added giving an additional coating to the particles. Excellent filler retention is obtained without the use of alum or other acidic material. R.A.

Blue Print Paper Sized with Magnesium Hydroxide (IX p. 404)

XII—LEATHER; FURS; OTHER PROTEIN MATERIALS**Quantitative Study of Fastness of Leather to Wet-rubbing**

C. H. Spiers and J. P. W. Burnett

J. Soc. Leather Trades' Chem., 43, 38-50 (Feb. 1959)

The SATRA machine has been used to investigate quantitatively the rate of pigment removal from a pigment-finished leather by wet-rubbing. The felt pads, the moisture content of which is standardised, are changed every 25 revolutions and the pigment removed is found by analysis. Pigment is removed from a casein-based finish, fixed or not, at a steady rate; it thus depends on abrasion rather than solubilisation of the binder. Fixation with HCHO-acetic acid, HCHO-chrome alum, or HCHO-chromium acetate greatly improves the fastness; the last-named is slightly the most effective. Ageing beyond 2 days after fixation has little value with HCHO-chromium acetate, but ageing for 7 days is advantageous with HCHO-acetic acid fixation. Plating a leather with a casein finish fixed with HCHO-acetic acid appears to damage the outer layers of the finish and to improve the inner. Fastness is improved by using a higher proportion of casein binder since more binder must be removed to release the same amount of pigment. The pigmented film is protected against abrasion by the application of a clear casein sealer. Addition of a resin emulsion to a casein-based pigmented finish apparently produces a layered coating: addition of a small amount gives an outer abrasive-resistant pigmented resinous layer over the casein-based finish, whilst addition of large amounts produces an outer pigment-free, resinous layer, beneath which is a resinous pigmented layer which is more resistant to wet-rubbing than a casein-based pigmented layer. J.W.D.

Polysulphide Rubber Treatment for Glove and Shoe Upper Leathers

E. C. Dogliotti, C. W. Mann, and J. Barry

J. Amer. Leather Chem. Assoc., 54, 85-100 (Feb. 1959)

The liquid polysulphide polymer (Thiokol LP-32) together with morpholine (I) and tetrahydrofuryl alcohol (II) is applied to the grain layer only and is heat-cured in a drying tunnel; I acts as an amine curing agent, II as a copolymerising agent, and both act as diluents. The resulting leather has a high degree of resistance to penetration or absorption of petroleum products, liquid chemicals such as battery acid, and water; its flexible handle is not noticeably altered on prolonged storage. These properties suggest that it should give leather suitable for multi-purpose military gloves, but further trials are required to verify that it is suitable, especially with regard to water-resistance, for shoe uppers. The best results obtain with cowhide though good results can be achieved, with a little more trouble, with less compact leathers such as horsehide, sheepskin, and deerskin. Most of the numerous tests described were applied to chrome-tanned leathers, but other types of tannage have been successfully treated. The finished leather has no disagreeable odour, and the toxicity hazard is thought to be negligible. J.W.D.

Preparation of Pure Fibrous Collagen

C. Deasy *J. Amer. Leather Chem. Assoc.*, 54, 246-258 (May 1959)

The components of a skin other than fibrous collagen are discussed and methods available for their removal are reviewed. It is difficult to remove these substances without degrading the collagen. No single simple method is yet available. J.W.D.

XIII—RUBBER; RESINS; PLASTICS**Cross-linking of Polyamides by Radiation**

S. A. Pavlova, S. R. Rafikov, and B. L. Tsotlin

Doklady Akad. Nauk S.S.S.R., 123, 127-130 (1 Nov. 1958)

Anid G-669 (polymer from hexamethylenediamine with adipic and azelaic acid and caprolactam), irradiated with X-rays (80 kv., 20 ma.) in air, or in vacuum for 1-20 hr., is shown to undergo simultaneously two processes: cross-linking (increase in mol.wt.) and depolymerisation, the former process predominating on increased exposure time.

Information derived from viscosity measurements is based on Huggins's equation (*J. Amer. Chem. Soc.*, **64**, 2716 (1942)). G.J.K.

Enhancement of Radiation-induced Cross-linking of Polyvinyl Acetate

S. H. Pinner *Nature*, **183**, 1108-1109 (18 April 1959)
Allyl esters considerably increase the cross-linking of polyvinyl acetate on irradiation. A process of secondary initiation is suggested. W.R.M.

PATENTS

Manganous Pyrophosphate for stabilising Vinyl Polymers to Heat and Light

DuP *USP* 2,865,883
Addition of 3% of a manganous pyrophosphate to vinyl chloride polymers enables them to be exposed to heat and sunlight without it affecting either their colour or transparency. A suitable manganous pyrophosphate is the white pigment obtained by treating manganous sulphate with tetrasodium pyrophosphate in stoichiometrical proportions. C.O.C.

Decorated Melamine Resin Mouldings

British Oxygen Co. *BP* 812,572
Fabric is impregnated with at least its own weight of a melamine-formaldehyde resin precondensate and dried until the resin has only a small amount of residual flow. It is then placed in a heated mould and the mould filled with a melamine-formaldehyde moulding powder or composition. Pressure is then applied to the moulding and maintained long enough to cure the resin at the temperature of the mould. The design may be printed on the fabric in the usual way, no special pigment or treatment being needed. C.O.C.

Pigmented Plastics

Interchemical Corp. *USP* 2,868,662
A pigmented plastic composition suitable e.g. for the mass coloration of cellulose acetate spinning dope, is readily made by mixing the pigment, cellulose acetate, water and a volatile solvent for the cellulose acetate, particularly acetone, and then subjecting the mixture to high mechanical shearing and kneading action, e.g. on a two-roll differential speed mill. It is preferable that solvent lost by evaporation from the mill be replaced. Milling is continued until the mass begins to blister, at which time maximum dispersion has been reached. The dispersion is cooled and ground to the desired degree of fineness. The amount of solvent retained is too small to require a final drying. C.O.C.

Sizing Polyethylene Film

DuP *USP* 2,870,043
Application of a dialkyl silicone oil containing the recurring structure



(R = Alk of 1-5 C) and viscosity ≥ 1000 cs. at 38°C. confers enhanced slip, antiblocking and antistatic properties. The process is particularly useful on polyethylene film whose surface has been modified to improve the adhesion of printing inks to it. C.O.C.

Indelible Markings on Polyethylene

United Kingdom Atomic Energy Authority *BP* 813,930
An article of polyethylene is marked with an oil-soluble dye and then heated to 100-120°C. in the region of the marks. A suitable solution for the purpose consists of 0.3% C.I. Solvent Blue 7 dissolved in a 1.5% solution of polyisobutylene in a volatile organic solvent. C.O.C.

Silica Pigments (C.I. Pigment White 27) for Use in Rubber (IV p. 400)

XIV—ANALYSIS; TESTING; APPARATUS

Current Literature on pH Measurement in Textile Finishing *S.V.F. Fachorgan*, **14**, 40-43 (Jan. 1959)

Current Literature on rH Measurement in Textile Finishing *S.V.F. Fachorgan*, **14**, 43-44 (Jan. 1959)

Luminescent Determination of Gossypol

S. N. Vil'kova and A. L. Markman
Zhur. priklad. khim., **31**, 1548-1553 (Oct. 1958)

Variamine Blue (C.I. 37255) as a Colorimetric Reagent

L. Erdey and F. Szabadváry
Magyar Kémiai Folyóirat, **63**, (6-7), 153-158 (1957);
Hungarian Tech. Abs., **10**, (2), 36 (1958)

After a general discussion on the theory of colorimetric determinations with Variamine Blue the determination of vanadium (as chromate) and chromium is described in detail. C.J.W.H.

Spectrophotometric Determination of Stabilised Diazonium Compounds

H. M. Rosenberger and C. J. Shoemaker
Anal. Chem., **31**, 204-206 (Feb. 1959)

A simple, accurate spectrophotometric method for the determination of stabilised diazonium compounds utilises the maximum absorbance of an aqueous solution at 380 mμ. The method is rapid, requires no pretreatment of the sample, and represents a satisfactory control method for determining the rate of decomposition of diazonium salts. Results compare favourably with those obtained by the nitrometer method. L.T.W.

Adaptation of a Photometer for the Direct Recording of Column Chromatograms

M. Verzele *Nature*, **183**, 604-605 (28 Feb. 1959)

Characterisation of Aromatic Amines by p-p'-Nitrophenylazobenzoyl Derivatives

El S. Amin *J.C.S.*, 1619 (April 1959)
p-p'-Nitrophenylazobenzoyl chloride (I), already used for identification and separation of alcohols and aliphatic amines (cf. *J.C.S.*, 3764 (1957)), is now applied to 9 aromatic amines in pyridine-benzene at convenient temp. (usually refluxing for ca. 6 hr.). The bright red acyl deriv. melt sharply and at much higher temp. (in a convenient range) than do other deriv., and the m.p. differ sufficiently to be useful criteria. o-Aminophenol affords both N- and O-acyl cpd. with I, whereas p-phenylazobenzoyl chloride does not. Occasionally contaminating nitrophenylazobenzoic acid has to be removed chromatographically. H.H.H.

Rubeanic Acid and its Derivatives as Colorimetric Reagents. IV—NN'-Dibenzyl and NN'-Diphenyl-rubeanic Acids

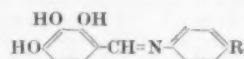
J. Xavier and P. Ráy
J. Indian Chem. Soc., **35**, 725-732 (Oct. 1958)
NN'-Diphenylrubeanic acid is more sensitive than its parent compound and gives metal complexes which are soluble in organic solvents such as isobutyl alcohol. It is especially useful for the spectrophotometric estimation of copper, nickel, cobalt, and palladium. Metal complexes of NN'-dibenzylrubeanic acid have low solubility in organic solvents. C.H.R.

Reactions of Rhenium with Methyl Violet (C.I. Basic Violet 1). I—Extraction of the Rhenium-Methyl Violet Complex

A. T. Pilipenko and V. A. Obolonych
Ukrain. khim. zhur., **24**, (4), 506-509 (1958)
Extraction of the rhenium-Methyl Violet complex with toluene (pH 3.5-5) is stated to be highly specific and is recommended for the colorimetric determination of rhenium. The sensitivity limit is 0.1 μg./ml.; a large excess of molybdenum does not interfere. The absorption curve for the perhenate-Methyl Violet complex in toluene is given. G.J.K.

Synthesis of Azomethin Derivatives of Pyrogallol Aldehyde and their Reactions with Metal Ions

A. T. Slyusarev and A. L. Gershins
Ukrain. khim. zhur., **24**, (5), 639-642 (1958)
Azomethin derivatives of pyrogallol aldehyde of the general formula—



(R = H, CH₃, OH, N(CH₃)₂, N(C₂H₅)₂, NH-C₆H₅, Cl,

SO_3H , NO_2 , or COOH), have been synthesised and shown to form coloured compounds (pH 3-6) with Ti^{4+} , Fe^{3+} , Pb^{2+} , Bi^{3+} , VO_3^- , WO_4^{2-} , and MoO_4^{2-} ions, of which the titanium complexes have been investigated spectrophotometrically in 20% ethanol (pH 5-5.2). Positive substituents for R produce the strongest absorption.

G.J.K.

Preparing Cross-sections of Fibres and Fabrics

O. Rothe *Melliand Textilber.*, **40**, 432-436 (April 1959)

A detailed practical discussion, with 9 illustrations and 12 references. Stiffening and embedding media are described, and instruction is given in preparing and cutting material and in the preparation of slides suitable for microscopic observation.

S.M.J.

Fibre Section Cutting by the Plate Method

J. E. Ford and S. C. Simmens

J. Textile Inst., **50**, r 148-r 158 (March 1959)

The fibre bundle is threaded through a small hole in a plane, stainless steel plate about the size of a microscope slide, and cut flush with each side using a razor blade. The plate is put on a microscope slide, a suitable immersion medium added depending on the sample, a cover glass is added, and the specimen viewed with the microscope without removing from the stainless steel plate. 11 photomicrographs.

P.T.S.

Fabric Handle Assessment—Application of Multiple Factor Analysis

W. S. Howorth and P. H. Oliver

J. Textile Inst., **49**, r 540-r 553 (Nov. 1958)

From each set of fabrics to be compared all possible pairs are presented to an observer to be judged. Inconsistent choices are used as a measure of the ability of the observer to distinguish differences between fabrics. It is found that a three-dimensional model can be used to display the relationship between the results of tests in which observers are asked to choose between pairs of fabrics and give reasons for the choice, usually in terms of smoothness, softness, firmness, coarseness, thickness, weight, etc. The model implies that three physical tests exist which will describe the handle of the fabric—tentatively, smoothness, stiffness, thickness. Only smoothness presents empirical difficulties in assessment.

P.T.S.

Determination of Resistance to Pressure of Pile Fabrics

W. Stockhausen

Melliand Textilber., **40**, 308-310 (March 1959)

A new method for determining the resistance to pressure of short-pile fabrics is described and illustrated. Test samples are loaded with 1 kg. for 1 hr., allowed to recover for a further hr., and the alteration of pile angle caused by the loading is measured using fixed magnifying glass and protractors. Percentage changes are rated very good for 0-10, good for 10-15, moderate for 15-20, poor for > 20. Results are reproducible and tally with usage evaluations.

S.M.J.

Apparatus for recording Sorption Kinetics

B. Rosen

J. Polymer Sci., **35**, 335-342 (March 1959)

A method for the continuous detection of the volume of vapour consumed by or evolved from a solid sample (of polymer) under constant vapour pressure and temperature.

P.T.S.

Lignified Fibre Damage—New Microscopical Test using Iodine and Sulphuric Acid

F. S. Young and W. R. Hindson

J. Textile Inst., **49**, r 554-r 560 (Nov. 1958)

Immerse sample with gentle stirring in 1.6 N NaOH at 20°C. for 15 min. Rinse in cold water and boil for 5 min. Allow sample to dry in air. Treat with iodine-KI solution for 3 min. at 20°C. on a microscope slide; remove excess of the solution. Mount the fibres in a glycerol-sulphuric acid and examine after 18 hr. under the microscope $\times 100$. Undamaged fibres and fibres damaged by fungal attack, acid, and acid oxidation are stained yellow. Heat, light, weather, and alkaline oxidation cause the fibres to be stained green or blue in the test. Jute and sisal have been tested in this way.

P.T.S.

Determination of Conductivity, pH, Water-soluble Matter, Chloride, Sulphate in Aqueous Extracts of Textile Materials

Textile Institute *Tentative Textile Standard No. 52* (1958)

J. Textile Inst., **49**, r 724-r 731 (Dec. 1958)

Many official specifications set limits to the amounts of water-soluble impurities permissible in textiles. The instructions for preparing the extract and carrying out the estimations vary from one specification to another. In this tentative textile standard, standard methods of estimation are adapted which may be generally acceptable.

P.T.S.

Dye Staining Technique

R. M. Smith *Text. Research J.*, **28**, 1049-1051 (Dec. 1958)

A mounting solution containing an orange dye for hydrophobic materials and a blue dye for hydrophilic fibres is described and its use illustrated. Tables of the colours given by various materials if present in the section being mounted are included.

S.B.D.

Quantitative Analysis of Binary Fibre Mixtures containing Tricel (Cellulose Triacetate)

W. Armfield *J. Textile Inst.*, **50**, r 51-r 55 (Jan. 1959)

The second fibres in the binary mixtures were wool, cotton, 6,6-nylon, Terylene, Fibrolane BX, Courtele, Orlon-42, Fibro, and secondary cellulose acetate. In the last case a 70% (vol./vol.) aqueous acetone mixture was used to dissolve the secondary cellulose acetate; in all other cases the Tricel was dissolved in methylene chloride. The dissolution of one component from the binary mixtures was in every case carried out at room temperature with shaking.

P.T.S.

Determination of the Relative Viscosity of 6,6-Nylon in 90% Formic Acid

Textile Institute *Tentative Textile Standard No. 54* (1958)

J. Textile Inst., **49**, r 734-r 737 (Dec. 1958)

A weighed sample of nylon is dissolved in 90% formic acid to make an 8.4% (wt./wt.) solution. The viscosities of the solvent and the solution are measured at 25°C. using a U-tube viscometer. The densities of solvent and solution are measured at the same temperature. The relative viscosity of the solution is the ratio of the absolute viscosities of the solution and the solvent. It is a measure of the chain length or chain breakdown in the nylon, and is therefore related to the tensile properties of the sample. The method of determination is based on J. Boulton and D. C. L. Jackson's method (*J.S.D.C.*, **61**, 40 (1945)) refined by A. S. Smith (*J. Textile Inst.*, **48**, r 86 (1957)).

P.T.S.

Fractionation of Polyethylene Glycol Terephthalate

W. R. Moore and R. P. Sheldon

J. Textile Inst., **50**, r 294-r 296 (March 1959)

A 1% solution of the polymer in o-chlorophenol is treated with additions of n-hexane as a precipitant, and the supernatant solution is decanted from the precipitated gel after standing. The fractionation is carried out by further additions of n-hexane followed by decantings of the supernatant solution. The polymer is precipitated from the gel by added acetone, and after washing in acetone the viscosity of the polymer can be determined in dry o-chlorophenol. A molecular weight distribution found in a typical fractionation is given. Dichloroacetic acid can also be used as a solvent for the polymer.

P.T.S.

Polyethylene Terephthalate Fractionation

K. Ueberreiter and T. Götz

Makromol. Chem., **29**, 61-69 (Jan. 1959)

Polyethylene terephthalate can be fractionated by precipitation from m-cresol solution by ligroin; by distribution between two immiscible solvents, m-cresol and ligroin; or by lowering the temperature of a solution in dimethylformamide. The chain length is determined by acylating the hydroxyl end-groups with monochloroacetic acid and estimating the chlorine thus introduced into the polymer.

P.T.S.

Quantitative Measurement of Fabric Appearance—Practical Evaluation of Wash-and-wear Characteristics

C. R. Williams

Amer. Dyestuff Rep., **48**, 37-40 (23 Feb. 1959)

The principles governing the evaluation of the "wash-and-wear" characteristic appearance and the development

of and technical basis for the AATCC "Tentative Test Procedure 88-1958", are discussed. The adoption of three dimensional standard patterns, instead of the present two dimensional standard patterns, is proposed and their preparation is described. W.P.M.

Evaluation of the Effectiveness of Antibacterial Finishes for Cloth

P. A. Majors

Amer. Dyestuff Rep., 48, P 91-P 93 (9 Feb. 1959)
A method of determining the antibacterial activity imparted to cotton cloth by treatment with varying concentrations of phenylmercuric acetate (PMA), benzalkonium chloride and trichlorocarbonyl (TCC), is described. The method is based on the determination of titratable acid or alkali produced by the growth of the test organism in a highly buffered medium containing urea or glucose and held in the interstices of the test fabrics. Growth of *S. aureus* was entirely inhibited by cloth treated with 2.5 p.p.m. PMA, 20 p.p.m. TCC, or 62.5 p.p.m. benzalkonium chloride. Growth of *B. ammoniagenes* was inhibited similarly with 2.5 p.p.m. PMA, 20 p.p.m. TCC, or 125 p.p.m. benzalkonium chloride. Growth of *E. coli* and *P. mirabilis* was inhibited with 500 p.p.m. benzalkonium chloride or 10 p.p.m. PMA. Treatment with 40 p.p.m. TCC did not inhibit growth of *E. coli* or *P. mirabilis*. W.P.M.

Determination of Time of Burning

SNV 98 8 99 *Textil-Rund.*, 14, 32-34 (Jan. 1959)

A standard flammability test based on the U.S.A. Flammability Tester (Commercial Standard No. 191-53). S.R.C.

Sedimentation and Diffusion Measurements on Cellulose dissolved in Sodium Iron Tartrate Complex Solutions

S. Claesson, W. Bergmann, and G. Fayme

Svensk Papperstidning, 62, 141-155 (15 March 1959)
Sedimentation and diffusion measurements on four samples covering a wide range of D.P. show that the viscosity laws apply also to iron tartrate complex (E.W.N.N.). Oxygen degradation is considerably lower than with Cuen solvents. In both types of solvents, cellulose is in the monodisperse state. 18 references. (In German.) R.A.

Flat-headed Glass Electrodes for Measuring pH of Paper

F. L. Hudson and W. D. Milner

Svensk Papperstidning, 62, 83-84 (15 Feb. 1959)
The paper is placed on a 0.3-1.2 mm. damp sponge of foam cells ca. 1 mm. in diameter and of apparent d 0.03. The sponge must be well washed in dist. water until neutral. About 0.7 ml. distilled water is placed on the paper and standardised calomel and flat-headed glass electrodes are lowered on to it. The pH is measured on a direct-reading pH meter. Good agreement with the TAPPI cold extraction method has been obtained. (In English.) R.A.

Revision of the Dye Absorption Technique for the Estimation of External Specific Surface

E. F. Thode *TAPPI*, 42, 20-23 (Jan. 1959)

Principal changes from earlier techniques involve the use of specially purified dye, substitution of a more rapid fibre separation procedure, the use of a non-ionic dispersant to stabilise the samples for spectrophotometric analysis and the application of a modified Brunauer-Emmett-Teller technique to the analysis of the data. Pulp fibres are dispersed in low concentrations of a direct dye of very high mol.wt. for a limited time. The amount of dye taken up per g. of fibre at a given final dye concn. and the change in this figure with change in dye concn. gives an indication of the external specific surface of the fibre. Dye absorption gives a reasonable estimate of the comparative external specific surface of whole fibres, but is insensitive to fines when C.I. 29160 (Benzo Fast Scarlet 4BBA) is used. R.A.

Measurement of Brightness with particular reference to the Photovolt System

J. S. Burkitt

Appita, 12, 101-116 (Jan. 1959)

Two Photovolt reflection meters do not give the same reading, even when used with the same working standard. Each instrument and its working standard should be

standardised by means of paper standards, as the manufacturer's system of issuing "calibrated" working standards for use with any Photovolt meter is inaccurate. Some of the causes of correlation errors have been studied experimentally, resulting in useful servicing recommendations and a standardising procedure applicable to a variety of instruments. R.A.

Colorimetric Microdetermination of Nitrogen in Cellulose Nitrate by the Phenoldisulphonic Acid Method

J. L. Gardon and B. Leopold

Anal. Chem., 30, 2057-2060 (Dec. 1958)

The intense yellow colour produced by neutralising to pH 7.1-7.5 the reaction product of cellulose nitrate and phenoldisulphonic acid provides a method for the determination of the nitrogen content of cellulose nitrate. The colour density of the solution is measured at 400 m μ . By this method the nitrogen content can be determined accurately within $\pm 2\%$. L.T.W.

Inexpensive Spectrograph

G. M. Andrews

J. Oil and Col. Chem. Assocn., 42, 261-266 (April 1959)

An inexpensive spectrograph may be constructed easily by fixing a small direct-vision type pocket spectroscope to a simple camera. The instrument, which is fully described, is capable of revealing the presence of most major metallic elements and many minor components and impurities, by comparison of spectra with known spectra and by wavelength measurement of unidentified lines. Details and a photograph are given of a simple comparator, based on a measuring microscope, used for wavelength determination. Ten spectra obtained with the instrument are shown and briefly discussed. J.W.D.

Modified Method for determining the Reactivity of Viscose-grade Dissolving Pulps

W. Fock

Das Papier, 13, 92-95 (March 1959)

Determination of the insolubles in viscose is based on determination of the soluble fraction of cellulose in the clear part of the viscose by oxidation with dichromate-sulphuric acid, doing away with time-consuming filtration and centrifugation. The new method is simple and reliable and indicates the extent to which the reactivity of the pulp is affected by resin content and the structural properties of cellulose. R.A.

Viscosity Measurements of Pulps as a Basis for Determinations of Degree of Polymerisation

O. Ellefsen and S. V. Vardheim

Norsk Skogindustri, 13, 42-49 (Feb. 1959)

Too high D.P. values are obtained because of cross-linking in the trinitrates by intermolecular bonding between a keto group in one chain and a carbonyl group in the enol form in another. The effects of this cross-linking, which takes place after nitration, can be eliminated by pretreatment with sodium borohydride. Cross-linking does not occur in alkali celluloses, the carbonyl groups having been eliminated. (In English.) R.A.

Provisional Method for Testing the Fastness of Coloured Leather to Marking off

Society of Leather Trades' Chemists

J. Soc. Leather Trades' Chem., 43, 108-109 (April 1959)

The specimen of leather is stored under standardised conditions of heat and pressure in contact with filter paper. The staining on the filter paper is assessed with the standard grey scale. J.W.D.

Problems in devising Fastness Tests for Leather

A. W. Landmann

J. Soc. Leather Trades' Chem., 43, 112-117 (April 1959)

Fastness test methods may be judged by three criteria: accuracy, reproducibility, and adequacy of differentiation amongst samples of varying fastness. The work of the Fastness Tests Committee of the Society of Leather Trades' Chemists is described and various test methods for determining fastness to the following are discussed in the light of the above criteria: washing and transfer

of colour in washing; wet and dry rubbing; daylight; rubbing after wetting through with solvents; water and perspiration; organic solvents; heat; water spotting; and, marking off.
J.W.D.

Development of a Test for the Wash-fastness of Leather and the Staining of Accompanying Textile Materials

A. W. Landmann

J. Soc. Leather Trades' Chem.,
43, 117-128 (April 1959)

Neither paper dip nor optical density measurements based upon wash liquors provide a measure of liability to stain adjacent materials; work indicating this is reported. The effect upon washing tests of (i) the degree of mechanical agitation as determined by the rate and duration of stirring; (ii) the method of attachment of the accompanying textile material; (iii) the manner of squeezing out after rinsing; (iv) the drying conditions; and (v) the temp. of washing, has been determined systematically. Variations in temp. and mechanical action have significant effect but they are easily controlled within satisfactory limits. The textile must be separated from the leather before drying and, providing the samples are then suspended, the temp. of drying makes little difference. The textile and the leather should have one-point attachment as this washes the leather evenly and stains the cotton uniformly. Squeezing after each wash is recommended. At present the official washing test and the provisional test for transfer of colour in washing are separate; they can however be combined. Though the results will be similar there may be cases in which some leathers with poor fastness will be shielded by the fabric and will thereby acquire a falsely high rating.
J.W.D.

Observations on the Official Method for the Determination of Colour Tolerances

H. E. Nursten

J. Soc. Leather Trades' Chem., 43, 50-58 (Feb. 1959)

The author criticises the method officially adopted by the Society of Leather Trades' Chemists, and proposes the following amendments: 1. To the method of measuring chromaticity and luminance, covering (a) the limitations and possible errors; (b) a standard procedure for the preparation of samples in the case of sueded or printed leathers; (c) the use of a secondary standard more permanent than MgO; (d) improvement of the accuracy of measurement for samples of low luminance, e.g. by the specification of differential colorimetry. 2. To the method of calculating colour tolerance, covering adjustment of both the chromaticity and luminance data and their interdependence in accordance with acceptable experimental results.
J.W.D.

Supplementary Report of the Colour Committee of the S.L.T.C. on Nursten's Observations

J. S. Mudd (Convener)

J. Soc. Leather Trades' Chem., 43, 59-64 (Feb. 1959)

The report discusses the reproducibility errors likely to occur when colour measurements are made with the Hilger J.20 Tristimulus Colorimeter, and the derivation of the chromaticity ellipses and the graphical luminance tolerance used in the Official Method. The criticisms of H. E. Nursten (preceding abstract) are, on the whole, rejected.
J.W.D.

Spectrophotometric Determination of Styrene in a Styrene-Methyl Methacrylate Copolymer

A. V. Tobolsky, A. Eisenberg, and K. F. O'Driscoll

Anal. Chem., 31, 203-204 (Feb. 1959)

The styrene content of a styrene-methyl methacrylate copolymer is determined by measuring the absorbance at 269 μ . of a solution of the copolymer in chloroform (1 mg./ml.). Polymerised methyl methacrylate does not absorb at this wavelength.
L.T.W.

Determination of Free Formaldehyde in Resin-finished Goods

W. Himmelreich and W. Vauck

Deut. Textiltech., 8, 410 (1958)

Chem. Abs., 53, 1728 (25 Jan. 1959)

The amount of HCHO split off from the resin by titration with alkaline H_2O_2 at 50°C. corresponds to the amount

set free during ironing, so differentiating between a weak evolution of 0.2% and a strong evolution of 0.8%. Air must be excluded during the titration. As H_2O_2 decolorises phenolphthalein, the titration is best carried out electrometrically. The linear curve obtained by plotting "ironing value", expressed as % HCHO in 10 l. of air, determined by ironing, and the percentage of free HCHO determined by titration, does not pass through the origin because the ironing temperature is 180°C. and that of the titration 50°C.
C.O.C.

Estimation of Washing Loss of Resin-treated Cellulose

H. Jörder and G. Will

Melliand Textilber., 39, 1362-1364 (Dec. 1958)

Eight different methods are listed. Standardisation is recommended. It is emphasised, and experimentally verified, that samples dried at 80°C. for 3 hr. before washing instead of air-dried give misleading results because of post-condensation, loss of resin ranging from 8.5% instead of 54% for viscose rayon finished by drying only, to 5.5% instead of 13% for goods condensed for 5 min. at 145°C. Suggested procedure—store one week at 20°C., 65% R.H.; air-dry; weigh; wash 30 min. at 60°C. in 0.5% soap (liquor ratio 50:1); rinse 2 hr. in running water; dry 3 hr. at 110°C.; weigh. On further air-dry samples determine moisture content by reweighing after 3 hr. at 110°C., then extract resin (0.1 N-HCl, 30 min. at boil, liquor ratio 100:1, rinse 1 hr., dry).
S.M.J.

Determination of Ash Content of Pulp

P. O. Bethge and T. Tröng

Svensk Papperstidning, 61, 1016-1019 (15 Dec. 1958)

Conversion of the ash components into thermostable sulphates by treatment with H_2SO_4 and ignition at 700°C. overcomes the drawbacks of known methods and gives reproducible results. It is suggested that the method be adopted as standard procedure.
R.A.

Cadmium-Ethylenediamine Complex as Solvent for Cellulose

G. Jayme

Das Papier, 12, 624-632 (Dec. 1958)

"Cadoxen" $[Cd(en)_2](OH)_2$ is easily prepared, colourless, clear, and stable and, therefore, well suited for cellulose investigations, such as microscopic identification of parts of high degrees of polymerisation (edges of tracheids). Cadoxen-swollen fibres can be directly shadowed in a high vacuum with metals.
R.A.

Spot Test for Epoxy Resins

M. H. Swann

Off. Dig. Fed. Paint Varn. Prod. Cl., 30, 1277-1279 (Nov. 1958)

The sample is dissolved in conc. H_2SO_4 under defined conditions and the soln. is applied to acid-washed filter paper. In the presence of bisphenol-type epoxy resins a purple-blue coloration develops rapidly. The cellulose of the paper acts as both carrier and reagent, and in a tube test it may be replaced with any reducing sugar such as l-rhamnose. Unreacted epoxy resins may be differentiated from their fatty acid esters by their reaction, to give a blue colour, with lepidine.
J.W.D.

PATENTS

Optically Classifying Cotton Fibres or other Fibres having Durable Refracting Properties

"Licencia" Találmányokat Értékes Itó Vállalat

BP 808,605

Measuring the Moisture Content of Fabrics

Firestone Tire & Rubber Co.

USP 2,849,076

One pole of a D.C. source (ripple free and isolated from earth) is connected through a length of fabric to earth and the other pole is connected to earth through a known resistance. The potential difference across this resistance can be used as a measure of the amount of moisture in the fabric.
C.O.C.

Photometric Measuring of Transmitted Light

Keeler Optical Products

BP 811,667

Simple and robustly constructed apparatus for measuring the light transmitted through a liquid.
C.O.C.

Measuring and/or Controlling the Tension on Yarn during its processing
Linen Industry Research Assocn. BP 810,482

Measuring Fibre Characteristics by the Resistance to Air Flow of a Mass of Fibres
Sheffield Corpn. BP 810,995

Fabric Testing
American Association of Textile Chemists and Colorists
USP 2,862,383

Apparatus in which the test samples while entirely unsupported and unrestrained are repeatedly and randomly knocked against the abrasive coated surface of the container in which they are placed. This produces effects having much better correlation to the effects of actual use than those obtained when samples are abraded in a fixed position. C.O.C.

Wet-strength Paper Tester
Ontario Paper Co. BP 812,444

The test sheet is made on a forming wire which splits into two separable sections, the force required for such displacement and consequent rupture of the sheet being a measure of the "zero span" tensile strength of the wet sheet. The term "zero span" refers to the fact that the sheet is restrained by contact with the wire on both sides, up to the zone of rupture, the unrestrained, or free, span of the sheet which parts under tensile forces being exceedingly short, approaching zero length. By the application of vacuum the water content of the sheet is reduced to a predetermined level so that the zero span tensile strength can be correlated to the moisture content of the sheet. R.A.

Apparatus for the Precise Measurement of Optical and Geometric Properties of Fabrics
Institute of Textile Technology USP 2,869,416

Colour System for Matching and Compounding Colours (V p. 400)

Polyvinyl Chloride Fibres (VI p. 401)

Quantitative Study of Fastness of Leather to Wet-rubbing (XII p. 407)

XV— MISCELLANEOUS

Variation of the Twilight Sky Colour
N. B. Divari Doklady Akad. Nauk S.S.S.R., 122, 795-798 (11 Oct. 1958)

Comparison of experimental and calc. (1st order scatter) intensities for a given wavelength shows agreement up to sun's angle of 6° below the horizon and considerable deviation between 6° and 16° (darkness). These findings are said to be in agreement with those by Hulburt (*J. Opt. Soc. Am.*, 43, 113 (1953)). Colour temp. (CT) are measured for the two ranges 370-440 and 440-600 mμ. over the angles 2-16° and it is shown that whilst in the former range CT remains almost unchanged in the latter range a marked max. occurs at 10°. Max. separation of blue to red occurs at low angles, the colour bands converging as the angle increases. Within each colour band least widening occurs with the blue band. G.J.K.

Alterations in the Ranges of FD&C and Ext.D&C Colours

Anon. *Chem. Eng. News*, 37 (7), 35 (16 Feb. 1959)
The U.S. Food & Drug Administration has banned the use of FD&C Yellow No. 1, 2, 3, and 4 for colouring food. They may, however, still be used in drugs and cosmetics for external use for which purposes they will be called

Ext.D&C Yellow No. 7, 8, 9, and 10. Now that the use of these colours has been banned there are no oil soluble colours that may be certified for use in food in the U.S.A. However, it has been found that water-soluble colours approved by the Food & Drug Administration, when converted to lakes in Ca or Al substrates can be used instead of oil-soluble colours in many cases and it is proposed to amend the regulations to allow such lakes of all permitted colours to be used in food. FD&C Red No. 1 may no longer be used to colour oranges; a bill, however, is expected to be approved which allows a new colour, Citrus Red No. 2, to be used for this purpose. This bill would also enable FD&C Red No. 32 to be used similarly until 1 May 1959, so that there may be an orderly change over from the old colour to the new one. C.O.C.

PATENTS

Wood Stains containing Azo Dyes
Chadeloid Corpn. BP 807,822

The dyes obtained by coupling a diazotised primary aromatic amine with a flavonone derived from citrus material, e.g. naringenin, hesperetin and eriodictyol, when dissolved in a glycol ether and a volatile organic diluent, e.g. methanol, are wood stains which speedily penetrate and dry into wood without causing much raising of the grain. The stained wood is fast to light and bleeding. C.O.C.

Glass Colour Compositions
DuP USP 2,848,339

Compositions which melt sharply are obtained by heating glass colours to < 450°F. and keeping them under anhydrous conditions until they are mixed with the molten vehicle. C.O.C.

Anodising Aluminium and its Alloys
Sanford Process Co. BP 812,059

Hard-wearing anodised coatings are produced on aluminium by passing an electric current through an electrolytic cell in which the aluminium is the anode and which contains an electrolyte maintained at > 50°F. The voltage of the current is maintained at the critical voltage of the aluminium and is raised in steps to above this critical voltage, the current value being decreased after each increase in voltage has occurred. C.O.C.

Preparing Wood for Staining with Acid or Basic Dyes

Chadeloid Corpn. USP 2,867,493

The wood is treated with an agent which either acidifies and/or oxidises its surface, e.g. NaOCl or HNO₃, or renders it basic and/or reduces it, e.g. NaHS or SnCl₂. These treatments increase the affinity for acid and basic dyes respectively. They result in deeper, leveller and stronger staining. C.O.C.

Impregnating and Colouring Wood
Western Sealant Development Corpn. USP 2,867,543

Wood is heated and subjected to vacuum to remove air and volatile materials from it and is then impregnated with a resinous precondensate under pressure. The impregnated wood is then baked to cure the resin and baking continued until the wood has darkened to the extent desired. Thus white pine wood was heated to 120°F. in an autoclave under 3 mm. Hg pressure for 1 hr. A solution of a polyester resin and styrene containing benzyl peroxide as catalyst was run into the autoclave after the pressure had been released and forced into the wood under pressure. After excess resin had been brushed off the surface of the wood to leave only a thin surface layer of resin, the wood was baked at 250°F. for 1 hr. to set the resin. It was then heated at 350°F. for 1 hr. when a golden brown product was obtained which did not require varnishing or other protection. It could be cut to shape without affecting either its colour or surface appearance. C.O.C.

Aridye Aquaprint

AQUEOUS PIGMENT PRINTING COLOURS

for prints with a REALLY soft handle
particularly advantageous for printing on
NYLON & TERYLENE

FREEDOM from TACK

Eliminates danger of marking-off

QUICK DRYING

Allowing maximum production

* *Brilliant Shades*

* *Low-cost Binder*

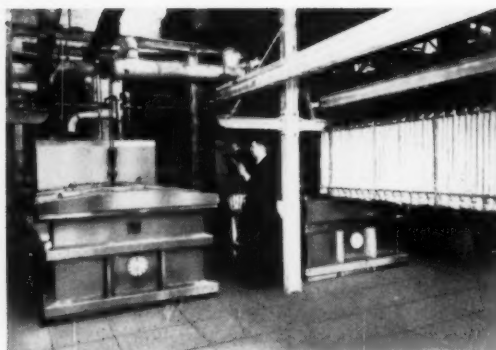
White AL. for the best matt white

for full details apply to:—

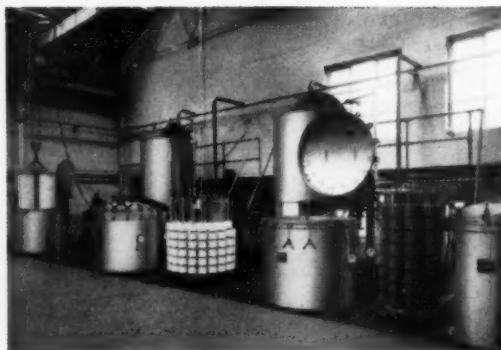
TENNANTS TEXTILE COLOURS LTD.

35/43 Ravenhill Road, Belfast or to the Area Distributors

Why not let **LONGCLOSE**, who have
 been manufacturing dyeing and bleaching
 machines for over 45 years, offer their services,
 technical "know how" and advice to you ?



Hank Dyeing machines incorporating the Brown/Longclose double stick system (patent)



Combined beam/package dyeing machines



We are exhibiting



The LONGCLOSE range includes pressure machines for operation at normal or high temperatures and machines for loose material, slubbing, yarn in hank or package, piece goods and garments

**CRESCENT WORKS, DEWSBURY ROAD, LEEDS 11
 TEL: LEEDS 77261. CABLES: MACHINES, LEEDS ENGLAND**

APPOINTMENTS etc

Advertisements relating to APPOINTMENTS VACANT, APPOINTMENTS WANTED, and MISCELLANEOUS ITEMS are invited for insertion on this page. Advertisements of Appointments Wanted are gratis to members, but must not exceed twenty-four words.

All inquiries relating to Advertisements should be addressed to THE GENERAL SECRETARY, THE SOCIETY OF DYERS and COLOURISTS, DEAN HOUSE, 19 PICCADILLY, BRADFORD 1, YORKSHIRE.

Replies may be addressed BOX —, THE SOCIETY OF DYERS and COLOURISTS, DEAN HOUSE, 19 PICCADILLY, BRADFORD 1, YORKSHIRE, where all communications relating to these Advertisements are treated in strict confidence.

APPOINTMENTS VACANT

TEXTILE CHEMISTS DYEING AND FINISHING

APPLICATIONS are invited for several vacancies caused by the expansion of the Textile Development Department of BRITISH NYLON SPINNERS. Candidates should have a degree in chemistry or textile chemistry, of at least 2nd Class Honours standard, and some experience in finishing methods is desirable; for one of the appointments specialist experience in proofing techniques would be most valuable. The work may be of two kinds: (i) Technical service to the trade either as a Representative or in the laboratory. (ii) Development work primarily in the laboratory on new methods of finishing nylon fabrics.

These jobs should prove attractive to those men who, while wishing to retain a firm grasp of their scientific training, wish also to see their energies directed to obviously useful ends. Since the objectives can only be properly pursued in co-operation with commercial staff and with other industries, there will be plenty of opportunity for the exercise of personal qualities, and for the demonstration of initiative and willingness to accept responsibility.

Conditions of employment are attractive and in line with the best available in industry today, and the Company's premises are in unexpectedly delightful countryside in a rural area, with good communications providing the best of town, sea and country. Housing presents little real difficulty, and the Company gives considerable assistance to new staff in resettling their families. Applications should be addressed to: Personnel Manager, British Nylon Spinners Limited, Pontypool, Monmouthshire.

ASSISTANT DYER—Patons & Baldwins Limited, Alloa, Scotland, are looking for a young (21–25) Assistant Dyer for their modern woollen and worsted dyehouse completed only two years ago. An O.N.C. in dyeing, or the equivalent, is essential and preference will be given to applicants with some practical experience of woollen and worsted dyeing. The starting salary will be good and there are excellent promotion prospects. A pension scheme is in operation and housing assistance may be given if necessary. Apply, in writing, to the Assistant Personnel Manager at the above address.

City of Leicester Education Committee
LEICESTER COLLEGE OF TECHNOLOGY
AND COMMERCE

Principal—R. E. Wood, M.Sc., F.Inst.P.

APPLICATIONS are invited for the post of Lecturer or Senior Lecturer in Dyeing and Finishing in the School of Chemistry, duties to begin as soon as possible.

Applicants should have suitable academic qualifications in Chemistry or in Applied Chemistry and have had experience in the Dyeing and Finishing Industry and/or research. Good facilities are available for carrying out research.

Salary, Burnham Technical Scale, Lecturer—£1,260 to £31 10s 0d to £1,417 10s 0d; Senior Lecturer—£1,417 10s 0d to £52 10s 0d to £1,627 10s 0d per annum.

Forms of application (to be returned as soon as possible) and further particulars can be obtained from the Registrar, College of Technology and Commerce, Leicester.

EXPERIENCED DYER required by well known West of Scotland firm of hand knitting and hosiery yarn dyers. Good pension scheme with definite prospects for successful applicant to whom a good salary will be paid. A five apartment detached house available if necessary at nominal rental. Apply in writing stating age, qualifications, positions held, together with copies of references to 2561, Wm. Porteous & Co., Glasgow.

FULLY qualified dyer required as manager of small but expanding dyehouse where all types of materials are processed. A house is available and salary by arrangement. Box V171

LOUGHBOROUGH DYEWORKS LTD., Whitegate, Loughborough, invite applications for the post of Assistant Yarn Dyer to assist present Head Dyer in the Bleaching and Dyeing of Wool and Synthetic Fibres. Good prospects to suitable applicant. Pension scheme and disturbance allowance to married man.

MIDLAND SILICONES LTD., an associate of Albright & Wilson (Mfg.) Ltd., requires a Senior Assistant Chemist in the Fluids and Textile Section of the Technical Service Dept. at Barry, Glam. The work is interesting and varied, ranging from laboratory research to contact with customers. It is concerned with the application and development of silicones in the dyeing and finishing of cotton goods. Candidates should be aged 22–28 and possess H.N.C. or equivalent in chemistry or textile technology and also have experience in general cotton textile finishing.

The post carries membership of the Company's non-contributory pension scheme. In addition a house purchase scheme is in operation. Applications, stating briefly age, qualifications and experience, should be addressed to the Staff Officer (Ref. 558), Albright & Wilson (Mfg.) Ltd., P.O. Box 3, Oldbury, near Birmingham.

MIDLAND SILICONES LIMITED requires a Graduate Chemist, aged 28–33 as Head of the Textiles and Resins Section in its Product Development Group at Barry, Glam. The work is in a rapidly expanding department shortly to move to new laboratories. It involves leading a team of chemists engaged on investigations and applied research aimed at developing new and improved silicone resins and textile treatments. Research experience is essential, either at University or in industry. This post will interest those who have been undertaking research and who now wish to obtain experience of leadership.

The Company operates a non-contributory pension scheme and a house purchase scheme is also in operation. Please apply stating briefly age, qualifications and experience to the Staff Officer (Ref. 573), Albright and Wilson (Mfg.) Limited (with whom Midland Silicones is associated), P.O. Box 3, Oldbury, near Birmingham.

RESEARCH CHEMIST required to be responsible direct to the Chief Chemist. A certain amount of day to day works problems will be incorporated in this post, but in the main the duties will consist of research work on textile printing, colours and cloth (principally cotton). Age about 35 years, with experience. Replies to Chief Chemist, Sanderson Fabrics, Uxbridge, Middlesex.

TEXTILE/COLOUR CHEMIST—COURTAULDS LTD. has vacancies in the textile laboratory attached to its expanding dyeing, finishing and development unit, Coventry. Applicants should be between 30 and 40 years of age and must have had experience in the dyeing industry. A degree in chemistry preferred but minimum qualification is a diploma such as A.S.D.C. or A.T.I. Candidates should write for a detailed form of application to the Director of Personnel, Courtaulds Limited, 16 St. Martins-le-Grand, London E.C.1, quoting reference number C.7.

TODD & DUNCAN LTD., Kinross, Scotland, require graduate in dyeing and colour chemistry. Age 25–35. To work with present head dyer on bleaching and dyeing of Cashmere and fine wools. A very good position and prospects await the right man. Replies will be treated as confidential.

WANTED FOR INDIA ON CONTRACT two technical experts for bleaching, dyeing, printing, mercerising, drip-dry antisease dimensionally stable fabrics. Salary no consideration for really top class persons. Apply with complete curriculum vitae. Box V170

WANTED—Young Assistant Dyer to take charge of Svetema Pad Roll Bleaching and Dyeing Range. Full details in confidence to Box V172

APPOINTMENT WANTED

HEAD DYER, 51, Fully experienced and Technically trained Ladies' Dress Goods, all types of Union Piece Goods. Desirous of change. Would consider Representative appointment. Box W613

BUILDING REQUIRED

WANTED—Mainly single storied premises area approx. 90,000 sq. ft. in Manchester/Bolton area suitable for use as bleach and dyeworks. Must have good loading facilities, water supply and effluent disposal. Box W614

MEMBERS' CHANGES OF ADDRESS

- Beeley, E., *formerly of* Sheepy Hall Cottage, Sheepy Magna, near Atherstone, Warwickshire, *to c/o* The Union Wool & Leather Co., Church Street, Nuneaton, Warwickshire
- Brown, C., *formerly of* 2 Greenway, Oldfield Brow, Altrincham, Cheshire, *to* 17 Truro Drive, Sale, Cheshire
- Cattoire, A., *formerly of* B.34, La Residence du Parc., Croix, Nord, France, *to* Institut International des Brevets, 97 Nieuwe Parklaan, The Hague, Holland
- Dadabhoy, M. A., *formerly of* 9 St. Andrew's Street, Blackburn, Lanc., *to c/o* Dacon Mills, 532 Dalhousie Street, P.O. Box 467, Rangoon, Burma
- Dossa, F., *formerly of* North Carolina State College of Agriculture and Engineering, Raleigh, U.S.A., *to c/o* Messrs. Haji E. Dossa & Sons, Lotia Chambers, Nicol Road, P.O.B. 4012, Karachi-2, Pakistan
- Erga, R., *formerly of* 141 Ordnance Street, Kingston, Ontario, Canada, *to* 193 Yonge Street, Kingston, Ontario, Canada
- Fletcher, J. C., *formerly of* Clare Royd, Hesketh Place, Lightcliffe, near Halifax, *to* Wool Industries Research Association, Torridon, Headingley, Leeds 6
- Godber, F., *formerly of* 23 Sutton Avenue, Chellaston, near Derby, *to* Plot 23, Oakside Crescent, Evington, Hall Estate, Leicester
- Greaves, B., *formerly of* 24 Hillfoot Crescent, Pudsey, Yorks., *to* 12 Westfield, Stanningley, Pudsey
- Hall, W. M., *formerly of* 369 Beersbridge Road, Belfast, N. Ireland, *to* 33 Leopold Road, Waterloo, Liverpool 22
- Hallows, H. B., *formerly of* 35 Orchard Drive, Braintree, Essex, *to* 54 North Road, Glossop, Derbyshire
- Harvey, D. W., *formerly of* 611 Sewall Highway, Courthouse Green, Coventry, *to* Domil Limited, 4790 St. Ambrose Street, Montreal, P.Q., Canada
- Hawkins, J. N. R., *formerly of* Lane End, Wymondley Road, Hitchin, Herts., *to* 3 Pond Farm Cottages, Lilley, Herts.
- Hopwood, S., *formerly of* 'Knowsley', 8 Halesden Road, Heaton Chapel, Stockport, *to* 470 Royal Exchange, Manchester 2
- Howarth, A., *formerly of* 14 Salisbury Street, Hoslingden, Rossendale, Lancs., *to* 47 Marina Road, Bradbury, near Stockport
- Howarth, J. K., *formerly of* 14 Greenville Avenue, Leeds 12, *to* 3 Hollin Gardens, Leeds 16
- Ingleby, W. B., *formerly of* 20 Erismere Avenue, Denton, Manchester, Lancs., *to* 22 Hawkins Drive, Ridgeway, Ambergate, Derbyshire
- Jackman, G. W. G., *formerly of* Camilatone Ltd., Edgeware Road, Welsh Harp, London N.W.9, *to c/o* Superma Ltd., Steele Road, Chiswick, London W.14
- Jowett, F., *formerly of* 7 Ashwell Lane, Glastonbury, Somerset, *to* 'Rannoch', Langley Park Road, Shreding Green, Iver, Bucks.
- Khan, G. N., *formerly of* 26 Collieridge Place, Bradford 3, *to* 15 Pemberton Drive, Bradford 7
- Kleinman, A., *formerly of* Hurst Lee Hotel, Hurst Lane, Glossop, Derbyshire, *to* Surrey Arms Hotel, High Street, Glossop, Derbyshire
- Lister, A., *formerly of* 11a Warrington Road, Higher Blackley, Manchester 9, *to* 93 Heywood Old Road, Rhodes, Middleton, Manchester
- McAllister, C. A., *formerly of* 12 Church Street, Bollington, near Macclesfield, Cheshire, *to* 19 Dan' yr' Heol, Cyncoed, Cardiff, Glam.
- McFarlane, A. J., *formerly of* 18 Bruce Street, Stirling, Scotland, *to c/o* Waugh 139 Portal Road, Grangemouth, By Falkirk, Scotland
- McKean, J. M., *formerly of* 15 Douglas Terrace, Dumbarton, Scotland, *to* 5065938 L.A.C. McKean, J. M., Royal Air Force Police, Main Guardroom, R.A.F. Weeton, near Preston, Lancashire
- Modrany, A., *formerly of* 46 Derby Grove, Lenton Sands, Nottingham, *to c/o* Texylon (Great Britain) Ltd., British and Overseas House, 82 84 Fenchurch Street, London E.C.3
- Murray, W., *formerly of* 88 Eildon Road, Hawick, Scotland, *to* 210 Mill Street, Ballarat, Victoria, Australia
- Padmanabhan, C. V., *formerly c/o* Coir Board (Government of India), Ernakulam, Post Box 80, (Kerala State), India, *to c/o* Central Coir Research Institute, Kalavoor P.O., Kerala State, India
- Payne, R. L. M., *formerly of* 73 Circular Road, Newtownards, Co. Down, Northern Ireland, *to* 'Brookside', Bangor Road, Newtownards, Co. Down, Northern Ireland
- Pensa, Ildo, *formerly of* La Residence, 5 Rue Courbet, Flixecourt, Somme, France, *to c/o* Mr. E. Rofe, 2565 Ocean Parkway, Brooklyn 35, N.Y., U.S.A.
- Porter, A., *formerly of* 451 Blackmoorfoot Road, Crossland Moor, Huddersfield, *to* 112 Long Lane, Dalton, Huddersfield
- Royer, George L., *formerly of* American Cyanamid Co., 30 Rockefeller Plaza, New York 20, U.S.A., *to* American Cyanamid Co., 1937 West Main Street, Stamford, Connecticut, U.S.A.
- Sanders, J. D., *formerly of* 41 Allerton Grange Vale, Leeds 17, Yorkshire, *to* 35 Hood Avenue, St. Mary Cray, Kent
- Sewell, E., *formerly of* P.O. Box 217, Cap de la Madeleine, P.Q., Canada, *to* P.O. Box 634, Trois Rivières, P. Quebec, Canada
- Sheehan, C. R., *formerly of* 721 Sedfield Drive, Warwick, Virginia, U.S.A., *to* 102 Governor Berkley Road, Williamsburg, Virginia, U.S.A.
- Smith, A. K., *formerly of* Glen-I-Moor, Fastwood Crescent, Cottingley, Bingley, *to* Lyndale, 10 Kendal Road, Holcombe Brook, Bury, Lancashire
- Strachan, S., *formerly of* Flat 1, 10 Leslie Road, Forest Fields, Nottingham, *to* 63 Hinckley Road, Leicester
- Straw, W. A., *formerly of* Hill Croft, 39 The Moorway, Tranmere Park, Guseley, Yorks., *to* Swithland, Southway, Tranmere Park, Guseley, Yorks.
- Tennant, A. S., *formerly of* 72 Willowbrae Avenue, Edinburgh 8, *to* 39 Balgillo Road, Broughty Ferry, Angus
- Williams, G. M., *formerly of* 3 Hartington Road, Bramhall, Stockport, Cheshire, *to* 12 Midland Road, Bramhall, Stockport
- Wright, J. C., *formerly of* 20 Wimborne Road, Leicester, *to* Imperial Chemical Ind. Ltd., Area Sales Office, P.O. Box 39, 124 Granby Street, Leicester
- Wilson, H., *formerly c/o* Emulsion Printing Ltd., Carlton House, 28 Chorlton Road, Manchester 15, *to* 'Shenstone', Cote Green Road, Marple Bridge, Cheshire

ADDRESSES WANTED FOR RE-DIRECTION OF JOURNALS

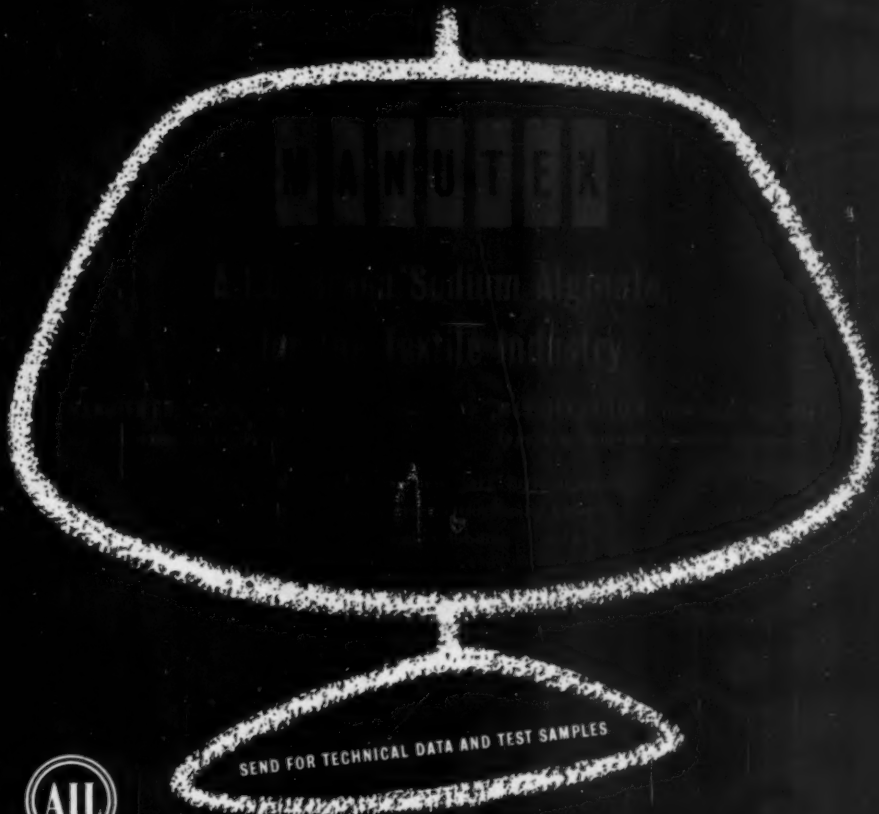
The Journals of the Society having been returned through the post it is desired to obtain information for these to be forwarded and any assistance in this respect will be appreciated

- Anthony, B. L. P., *formerly of* 68 Windhill Lane, Wighwick, Compton, Staffs.
- Levitt, H., *formerly of* 1888 Bathgate Avenue, Bronx 57, New York, U.S.A.
- Malwin, Victor, M.Sc., *formerly of* The South African Bureau of Standards, Private Bag, 191 Pretoria, S. Africa
- Makarewicz, C., *formerly of* 87 Corporation Road, Nottingham
- Osman, A., *formerly of* Usines Textiles, Alkahira, Shoulina Elkheina, Cairo, Egypt
- Walker, T. H., *formerly of* J. L. Stifel & Sons Inc., 339 Main Street, Wheeling, W. Va., U.S.A.

ALGINATES

with Reactive Dyestuffs (Procions, Cibacrons, Remazols)

Sodium alginate is the thickening agent most widely recommended for printing the new reactive dyestuffs; also for preventing migration of dyestuff during intermediate drying when dyeing by the "wet-on-dry" process.



SEND FOR TECHNICAL DATA AND TEST SAMPLES

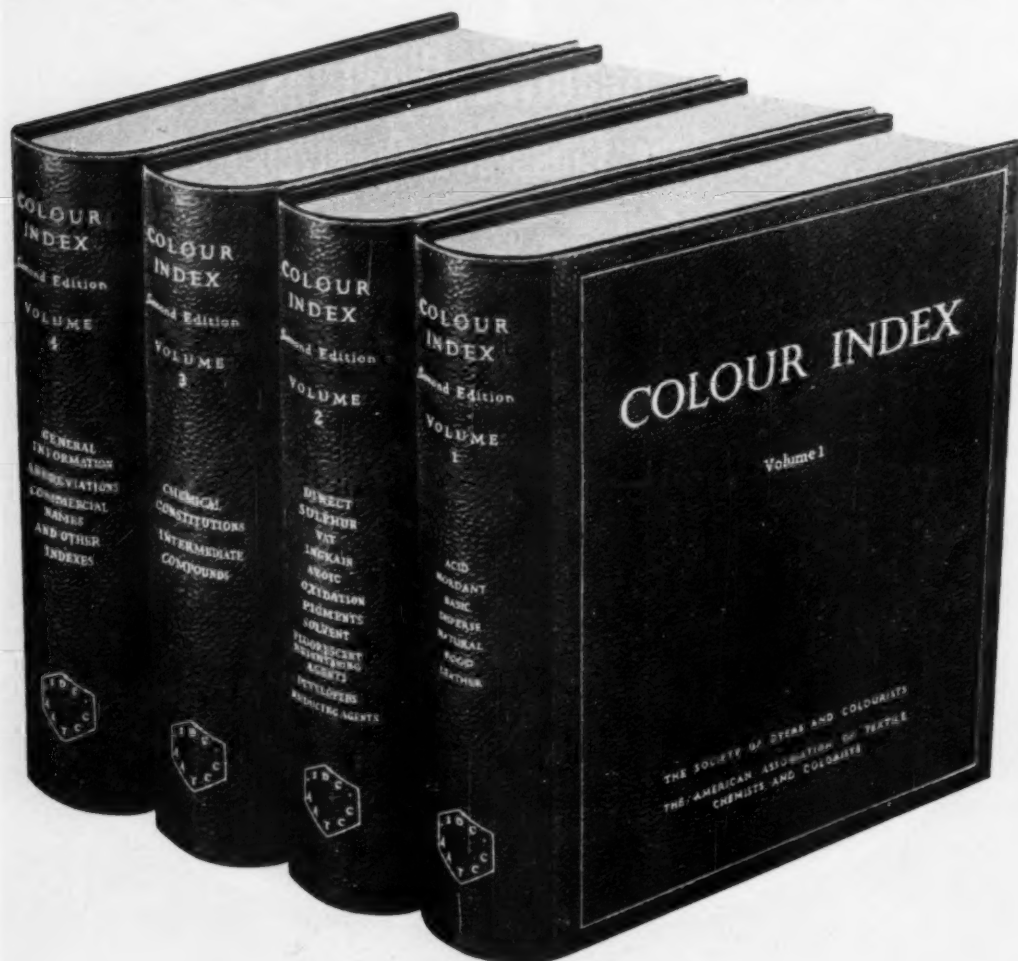
ALGINATE INDUSTRIES LIMITED

WALTER HOUSE, BEDFORD STREET, LONDON, W.C.2.

• TELEPHONE: TEMPLE BAR 0451

NEW COLOUR INDEX

Produced by
THE SOCIETY OF DYERS AND COLOURISTS
and
THE AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS



THE NEW COLOUR INDEX IS IN FOUR VOLUMES
ALL VOLUMES ARE NOW AVAILABLE

Price £40 per set

Full particulars from

THE SOCIETY OF DYERS AND COLOURISTS
DEAN HOUSE 19 PICCADILLY BRADFORD 1 YORKSHIRE ENGLAND

J C BOTTOMLEY & EMERSON LTD

Manufacturers of
**DIRECT AND UNION FAST TO
LIGHT, ACID, LEATHER AND
PAPER DYESTUFFS**

We also specialise in the manufacture of

METACHROME DYESTUFFS

LONGROYD BRIDGE

HUDDERSFIELD

Telephone 4241 (2 lines)



**BROWN & FORTH
LIMITED**
FOUNDED 1890

Sole Distributors in the UK & Eire
of the
new cationic softener

"AVITEX" NA

for improving the "hand" and
pliability, and for reducing static
electricity on synthetic fibres
and fabrics

manufactured by

**E I du Pont de Nemours
& Co (Inc) USA**

83-117 EUSTON ROAD 81 CORNBROOK STREET
LONDON NW 1 MANCHESTER 16

EUS 5101-5

MOS 1347-8

AND AT NEW YORK

**L J POINTING
& SON LTD**

Established 1916

HEXHAM

NORTHUMBERLAND

manufacture particularly

SPECIALITY DYESTUFFS

for

**OILS, FATS & WAXES
VARNISHES & LACQUERS
LEATHER OF ALL TANNAGES**

and

EDIBLE COLOURS

*(guaranteed to meet all
existing regulations)*

**ENQUIRIES GIVEN IMMEDIATE
AND CAREFUL ATTENTION**

Telephones
Hexham 942 (3 lines)

Telegrams
POINTING HEXHAM

INTERNATIONAL FEDERATION OF ASSOCIATIONS OF
TEXTILE CHEMISTS AND COLOURISTS

1959 LONDON INTERNATIONAL CONGRESS

Patron — H R H THE DUKE OF EDINBURGH KG KT

This is the first visit to England by the International Federation of Associations of Textile Chemists and Colourists and the *host member Society* is The Society of Dyers and Colourists

The Congress will be held on
WEDNESDAY THURSDAY FRIDAY 16 17 18 SEPTEMBER 1959
with the Congress centre at
CHURCH HOUSE DEAN'S YARD WESTMINSTER LONDON
where international language translations will be available by speech amplification and simultaneous interpretation ear-phone equipment connected to all seats

Title of Congress — **Developments in Dyeing, Printing, and Finishing**

Headquarters Hotel — **GROSVENOR HOUSE PARK LANE LONDON**
Telephone Grosvenor 6363 *Telegrams* AUDLEY LONDON

During the Congress the social events will include

Reception at Guildhall

The Orchestra of the Coldstream Guards

By permission of Colonel R J V Crichton MC Commanding Coldstream Guards
Conducted by Major Douglas A Pope ARCM psm Director of Music Coldstream Guards

Gala Dinner and Ball in The Great Room Grosvenor House
Sydney Lipton and his Ballroom Orchestra Midnight Cabaret

The social events will also include excursions and special attractions for the ladies



Tinolite Colours

Geigy

**bright
fast
economical**

pigment emulsions for textiles

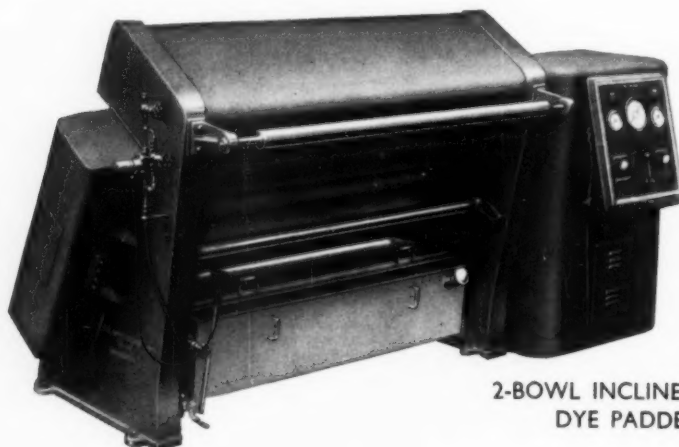
Excellent working properties
for ease of application by
roller and screen printing
methods and by padding to
cellulosic and synthetic fibres

The Geigy Company Ltd Rhodes Middleton Manchester

The New Farmer Norton Mangles with the Level Pressure System

In both the
models illustrated
the new patented
**LEVEL PRESSURE
SYSTEM** ensures

**NO BOWL
DEFLECTION**



2-BOWL INCLINED
DYE PADDER

OTHER REFINEMENTS INCLUDED IN
THESE NEW DESIGNS



3-BOWL HIGH
EXPRESSION MANGLE

- 1—Special small capacity troughs
- 2—Automatic dye level control
- 3—Totally enclosed drive
- 4—Built-in instrument panel

SIR JAMES FARMER NORTON & CO LTD

Over a Century's Service to the Textile Industries

ADELPHI IRONWORKS SALFORD 3 MANCHESTER

Telephone BLAckfriars 3613-4-5

Telegrams AGRICOLA MANCHESTER

INDEX TO ADVERTISERS

PAGE	
xxxv	ALGINATE INDUSTRIES LTD
iii	AMOA CHEMICAL CO LTD
xix	ANDREW ENGINEERING & DEVELOPMENT CO LTD
xxxvii	J C BOTTOMLEY & EMERSON LTD
xxiii	BROTHERTON & CO LTD
xxxvii	BROWN & FORTH LTD
xx	CATOMANCE LTD
xxi	CATOMANCE LTD
xviii	CIBA LTD
xxiv	CIBA CLAYTON LTD
iv	COLNE VALE DYE & CHEMICAL CO LTD
iv	CHAS FORTH & SON LTD
xxviii	GEIGY CO LTD
xxxix	GEIGY CO LTD
xii	GLOVERS (CHEMICALS) LTD
xiv	HARDMAN & HOLDEN LTD
xxii	HEXORAN CO LTD
i	HICKSON & WELCH LTD
xv	L B HOLLIDAY & CO LTD
xxv	HUNT & MOSCROP LTD
x	IMPERIAL CHEMICAL INDUSTRIES LTD
xxvi	IMPERIAL CHEMICAL INDUSTRIES LTD
xiii	LAPORTE CHEMICALS LTD
xxxii	LONGCLOSE ENGINEERING CO LTD
xxvii	MATHER & PLATT LTD
xi	SIR JAMES FARMER NORTON & CO LTD
v	SAMUEL PEGG & SON LTD
xxxvii	L J POINTING & SON LTD
xvi	JAMES ROBINSON & CO LTD
ix	SANDOZ PRODUCTS LTD
xi	SANDOZ PRODUCTS LTD
ii	SAUNDERS VALVE CO LTD
vii	SHELL CHEMICAL CO LTD
iii	SHIRLEY DEVELOPMENTS LTD
iv	STANDARD CHEMICAL CO
xxix	STOCKPORT UNITED CHEMICAL CO LTD
xxx	TENNANTS TEXTILE COLOURS LTD
viii	W P THOMPSON & CO
xxx	TOWN END CHEMICAL WORKS LTD
iii	J B WILKINSON (CHEMICALS) LTD
xvii	YORKSHIRE DYEWARE & CHEMICAL CO LTD